Handheld technologies and their role in supporting distance-learning study

Thesis

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Abstract

Distance education institutions have always employed a variety of technological media, and developing technologies are incorporated into the learning blend as their advantages are identified. Modern distance learning has, therefore, become linked implicitly with the latest media and handheld communication technologies are now being used to communicate with members of the educational community, share information and resources, and enable investigation, discussion and learning.

The use of similar mobile technologies for the purposes of student support is under-represented in the literature. This action research study explored the limitations and benefits of handheld technologies for supporting distance learning students, and the drivers and barriers that might affect their use by students. The literature review helped to identify the attributes and limitations of m-learning and handheld technologies, and the aspects of student support that might be enabled through mobile options. The research design included a questionnaire, a year-long study in which associate lecturers developed mobile-accessible resources to use with their students, and interviews with study support experts. The research data was collected in a UK distance education institution.

The study showed that handheld technologies can be used to support students for a number of different purposes: to provide an additional informal means of communication with staff and other students; to prompt participation or action; to suggest resources or personalise the support for students; to enable access to advice and guidance; to offer factual information for study and administrative purposes; to encourage revision and review of learning. The research also suggested that students felt that increased group cohesion was promoted within the learning community through using their personal mobile technologies within the student support framework.

A model of this potential method of support is presented, giving examples of the types of communications, resources and services that could be implemented within a distance education institution.

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Chapter 1: Introduction

The two underlying themes of this research are student support within distance education and handheld or mobile technologies, and these areas are beset by change. As Wink (2000) pointed out, anyone involved in the field of education must be prepared to encounter constant evolution in theories and practice.

> "How can learning possibly be static? It is inherently grounded in change. I find that when I take time to reflect on the many contradictions and changes, I am more comfortable moving through conflicting feelings and complex understandings" (Wink, 2000 p.15).

This thesis covers a subject and issues that are of relevance to a wide spectrum of higher education institutions (HEIs) and to their students, as it considers what is needed for effective student support and the ways that handheld technologies are impacting higher education. It investigates whether the use of the alternative materials or methods that are possible through these new technologies can be used to positive effect for the students, staff and institutions involved. The terms 'mobile' and 'handheld' are both used by different authors in the literature, and I have used them synonymously throughout this thesis.

The research design consisted of

- a pilot study with eight participants using a questionnaire to investigate student preferences and use of handheld technologies

- a year-long research study in which 14 associate lecturers (ALs) developed mobile-accessible support and communication materials for their students' use
- interviews with three experts in student support.

Historically, distance education has offered the option of study to those who have found it difficult or impossible to attend traditional educational institutions at set times and places. Originally the possibility of printed material being sent to students to study at home opened up learning to many who could not attend classes. Subsequently audio, radio and television were followed by video, computers, CD-ROM and DVD, which could offer explanations, discussions and interactive activities, allowing increased understanding over pure text. Support by telephone could give better clarification of problems than support by letter. The addition of web-based learning and computer communication gave distance students the chance to have their questions answered quickly, engage in discussions and, as the internet grew, discover wider sources of information and encounter other opinions. These media were followed by blogs, wikis and podcasts, and distance education continues to use a blend of the available media. Modern distance education has come to be linked implicitly with the latest means of technology, which currently includes digital and wireless communication.

Student-centred learning, personalisation and blended learning are goals of higher education providers, so it can be perceived as a positive step to allow the student the flexibility to not only choose the relevant support resources at the time they are needed, but also to choose from alternative methods of

access, particularly if such alternatives also enhance student learning because they suit the student's own learning preference.

While schools, colleges and universities are increasingly using these new mobile media for course-based learning options, my research interest was primarily to investigate whether distance HEIs could make beneficial use of mobile media in order to offer study support, both in a readily acceptable medium and 'on demand' to the entire range of distance learners, regardless of their age and economic standing. Study support is the area in which I work and therefore have a direct interest, and at the beginning of my research I was particularly interested in the resources that support study skills development. For example, it is important that distance students can access study skills resources with the minimum of time and effort so that they can concentrate on developing efficient and effective working methods. When starting on a new course they are already faced with the task of learning the course content, and need to be able to identify resources quickly and easily and in a medium that suits their access needs.

However, as my research continued I extended my focus to consider the wider aspects of student support, from the communication between the student and the distance education institution through tutors, students, faculty, advisers, administrators and to include the variety of service provision. Student services form a large part of any distance HEI, dealing with many underlying and administrative processes as well as with direct student contact and services. To give an idea of the scale of support that can be provided, the student services department of The Open University (OU) makes up a quarter

of the organisation; has around 1,300 staff working from 14 main sites; a budget of £1 million per year; and deals with one million phone calls and half a million emails each year (Swann, 2009).

However, Ryan et al. warned in 2000 that the internet's effect on education and the speed of the change would mean that materials being developed would need constant updating (Ryan et al., 2000). These new technologies are "reconstructing the world we live in, how we cook, communicate with each other, how we choose our entertainment and where, how and whether we can work and learn" (Raggatt et al., 1996 p.2). Mobile technologies were a new development and I knew that I would need to be prepared for flexibility in my research focus throughout my work as the technologies constantly developed and the possibilities subsequently altered. At the same time there are continuing changes within adult education that had to be taken into account.

> "If change and uncertainty have become part of the practices of lifelong learning, in which the varying boundaries around and within the field are challenged and shift, then developing strategies to identify, interpret and make judgements about the significance of such changes becomes critical" (Edwards et al., 1996 p.6).

My background

I cover my own educational background and subsequent experience here

because they necessarily impact on the shape and focus of my research. Ball is clear that some knowledge about the researcher as research instrument is as important within a qualitative research report as information about how data is collected within any report on quantitative research, because the data are socially constructed and depend on the researcher's interests and questions (Ball, 1993) while Reason and Bradbury state similarly that "the researcher is always a part of the world he or she studies" (Reason and Bradbury, 2001 p.6).

I gained an open degree with the OU as a mature student, across a variety of disciplines in Arts, Education, Social Science, Science and Technology but ultimately meeting the criteria for a degree in Psychology. This gave me the taste for 'lifelong learning': I subsequently gained postgraduate diplomas in both Management and Information Systems at a campus-based university, followed by a Master's degree in Online and Distance Education. I was a distance education tutor for seven years, mainly in the area of Communication and always using forums and email with students, and also spent ten years teaching information technology (IT) skills to adults. I have focused on study skills development for over 14 years, through workshops, writing for print, developing support materials for the first online course, and for the last ten years for OU websites. I have thus experienced both face-to-face and distance education from the perspectives of student and tutor, and am now a member of the support staff of a distance education institution.

Bullough (2006 p.5) argues that in research

> "What is required is a firm but playful embrace of otherness, of

> counter-cultural research assumptions, of stepping out of a comfortable research paradigm with attendant theories and into an uncomfortable one, even if for only as long as it takes to finish reading a helpfully disquieting book"

and goes on to list valuable research that was enlightened by influences outside standard educational discourse. I have used this perspective as encouragement to build on my own educational and work experience by considering literature, studies and evidence from a wide variety of sources and that encompass a range of views.

The support of distance students underlies my work and interests, although my area of research within education is necessarily influenced by the possibilities of technological methods and media in the area of advice and guidance. Although Bates was writing in 1995, his suggestions still ring true that the selection of technology for learning should be based on whether

- "it will work in a wide variety of contexts;
- it allows decisions to be taken at both a strategic, or institution-wide, level, and at a tactical, or instructional, level;
- it gives equal attention to instructional and operational issues;
- it will identify critical differences between different technologies, thus enabling an appropriate mix of technologies to be chosen for any given context;
- it will accommodate new developments in technology" (Bates, 1995 pp.35-36).

The interdisciplinarity of my own study background allows and encourages a wide range of enquiry, broadening the boundaries and assumptions that might be problematic if education was my only field of interest, and by considering alternative influences I hoped to avoid predictability in my research. As Jarvis et al. state in their discussion of the social background of lifelong learning

> "good practice does need to be informed by some awareness of the world around us. After all, teaching, learning and good practice itself are all social processes, and the process of globalization itself is a worldwide force for educational change" (Jarvis et al., 2003 p.13).

This need for awareness has involved keeping up-to-date with ongoing developments in learning and teaching theory and practice and in the specific topic areas of my research.

Since 1999 I have worked within the OU's Student Services in a team that develops online advice and guidance material, producing materials for students as well as for the tutors and other staff who support them. Most of our websites are openly available on the internet for enquirers and the general public. My role as lead instructional designer incorporates the development of the content and structure of such material, and I coordinate the evaluation that we regularly undertake to ensure that the material is accessible, usable and useful. Our team is keen to ensure that we use the most suitable media and have incorporated video, audio and interactive elements. However, new technological developments may provide valuable alternative ways of reaching an increased number of students, and this research was designed to investigate those possibilities.

Context of the research

The data collection for this research took place within the OU, a distance education institution that develops learning materials centrally while providing teaching and assessment to small groups of allocated students through associate lecturers or tutors, with additional support provided through a network of staff by telephone, email, letter, on the web and in print. Online technologies transmit learning materials and information and allow distance students to discuss, debate and absorb new ideas. This opportunity to make contact with others and to feel connected is one of the benefits that e-learning offers through forums and email, providing a connection to enthusiastic and supportive staff and students: this was part of the success of modern distance education.

Distance adult education has adopted web-based online learning as an alternative medium for reaching and teaching students, one of many media within blended learning. The OU has some 180,000 students, the great majority of whom are expected to be connected online, either as an integral part of their course or as the main teaching method: the only students who do not need computer access are those taking Openings courses, who number about 14,500 annually. There are now compulsory information technology (IT) elements for all other OU courses, and an increase in web-focused courses. Online technology allows the transmission of learning materials and information to students, in an environment where distance students can discuss, debate and absorb new ideas.

Developing alongside this use of technology within courses, online study

advice and guidance has been provided by the OU through a blend of media, beginning in 2000 with the topic of course choice and expanding to include areas that describe services for disabled students, career planning, induction, personal development planning, assessment and study skills. The OU now has considerable expertise in providing such online study skills resources.

Recent developments in technology

Recently, in addition to desktop or laptop computers, forms of technological hardware that were designed as communication or data devices, such as mobile phones, mp3 audio players, personal digital assistants (PDAs) or gaming devices with internet connection, have been used in learning. Their portability allows access to information at any time to suit the user, so can be a way to fit learning into a distance student's crowded timetable. Web pages can be designed, structured and built for access by mobile devices. Whether finding information through a mobile phone or downloading podcast audio or video material, new ways of offering information now exist and ownership of these items is notably far more extensive than that of computers. Third generation (3G) phones enable a rich mixture of additional media, including video, graphics transfer, music, information gathering and file sharing.

In tandem with m-learning, Web 2.0 developments have offered a different way of working through interactivity rather than broadcast, through a huge variety of web-based software tools and database-run sites that allow social collaboration and sharing of knowledge, and these have provided a rich user experience and engaging options that have increased the impetus for mobile

access. Successful Web 2.0 companies make use of the collective intelligence of their users' input, knowledge and interest through podcasts, blogs, wikis and shared information. (A podcast is an audio file that can be subscribed to as part of a series and can be listened to on an mp3 player; a blog (or web log) is a web-based diary space that can be used to explain and consider issues or prompt comments from others; a wiki is a shared web space where people can collaborate to develop written material by adding or editing online - the best known of these is Wikipedia, an online encyclopaedia where shared knowledge provides the descriptions). Some key Web 2.0 examples include Flickr photo sharing; YouTube video sharing; Facebook online communities; Amazon retail; eBay public auction; Del.icio.us shared bookmarking; Google tools and applications that allow people to use their handheld devices to access local or global information. Other sites particularly encourage mobile input because of the way they are structured: Twitter is a contact updating site that is entirely based on short text-type messages (links to these websites are shown in Appendix 19). This active contribution encourages participation and lets people become co-developers of content. RSS (really simple syndication) technology allows people to subscribe to a web page and be notified when it changes, obviating the need to visit many web pages in case something has been posted. This was initially useful for those interested in the regular updates on blogs and wikis, but the RSS system is now available on many sites. Figure 1 shows how a wide range of information can be collected or 'aggregated' by RSS feeds, a system that is of great advantage for the subscriber who can have a variety of information 'delivered' rather than have to collect it from a multitude of online sources.

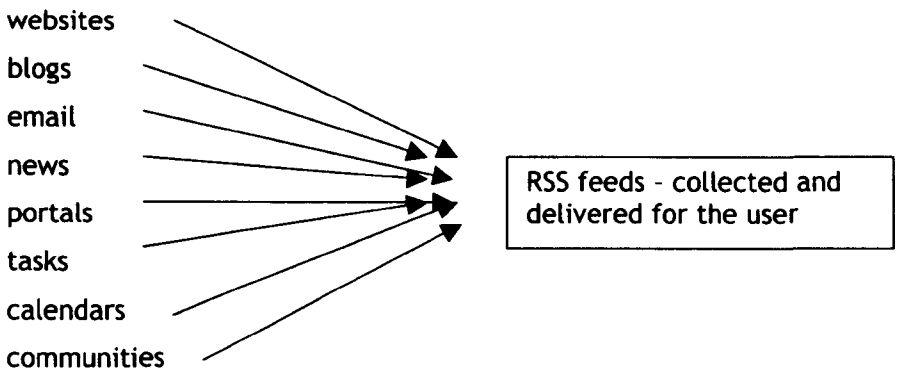


Figure 1: Aggregation of information by RSS feeds

Aims and purpose of the research study

When this research was first proposed about four years ago, mobile or handheld technologies were in their early stages and I initially planned to consider whether the use of these latest handheld technologies might be beneficial for study skills development in distance education. Since that time, however, the national (and global) and educational climates have changed and such technologies are integrated into many parts of the culture, and there are now various institutional developments to offer such technologies to its students. However, my focus was on student support and what has been learned during my research is applicable to educational institutions that are interested in using handheld technologies in that area, but particularly to those providing distance education to their students.

My study design has been emergent during a time when people in the field of higher education (HE) have responded to mobile learning (m-learning) and handheld devices have become increasingly able to support more complex

uses, including a greater variety of media. My initial aim was to research two main areas:

- to investigate the processes behind m-learning resource development, to inform future decision-making and practice
- to discover whether mobile accessible materials offer benefits in the area of student support.

Research questions

These were my main research questions that underpinned the design and development of this study.

1. What is the relationship between mobile learning technologies and the development and enhancement of student learning in higher education?
2. What are the main drivers and barriers that encourage or dissuade students from making use of mobile learning technologies, and how might these influence the nature of the student support offered by higher education institutions?
3. If the use of mobile learning technologies enhances the student learning experience within a distance education context, in what ways could HEIs make use of these mobile learning technologies for student support?

Rationale for and relevance of research

The value of this study to education teaching in a wider context is supported by the fact that the context for the data collection is within the OU, the

largest UK provider of tertiary distance education with a completely open access policy for its undergraduate students, which means that many students begin and complete OU courses without having first gained the types of qualification required by HEIs elsewhere. Consequently, students start with the widest possible range of abilities and skills, and student support is an important issue. If m-learning could offer useful student support and study skills provision within this institution, this should be applicable to other students taking part in a wide range of further and higher education at other institutions, including part-time and off-campus learning.

Distance education has traditionally attracted mature students, but younger students are being encouraged to study through distance education, which offers them the option of working while they study and a way of avoiding the increasing annual fees of other HEIs, particularly relevant in the current difficult financial climate. However, even a large influx of younger students would not sufficiently alter the proportion of younger students to bring the distance institutions into line with other HEIs, whose main demographic group has always been based on students of 21 and below and who form the greater proportion of university entrants. These younger students are more likely to be knowledgeable users of the newer technologies that may not necessarily be part of the everyday experience of many older students. Prensky (2001 p.1) refers to them as "digital natives" for whom technology certainly poses no barriers and outlines aspects of the different environment in which they are growing up, and this area of the literature will be covered further in Chapter 2. Although some of Prensky's original claims about these digital natives now seem somewhat simplistic, it is true to say that people now use mobile

technologies to access information in a new way, and my research has looked at how such alternative methods might offer opportunities to enhance student support for students of all ages in order to make it more effective.

Whenever new methods of learning delivery have developed, there has been long discussion of their benefits and constraints. Some technological changes appeared to merely offer minor improvements: after all, a student could get advice or information by writing a letter before email was an option, and listening to a discussion downloaded from a website might not seem very different from using an audiocassette. However, the addition of computers has proved to be transformational in the type of work that can be facilitated and gradually distance education has become quite different from what was available before: it appears that the use of handheld mobile technologies might offer a similar step-change in the field of distance education. I wanted to know whether these methods had the potential to offer distance students a way to access learning that is sufficiently different from what was previously available that their learning, motivation or understanding could increase, they would feel more involved and interested in the process, and student retention would improve. Cottrell (2001) argues that a benefit to the institution of improved learning skills is that students are more likely to complete their course. By concentrating my research on the possibility of using m-learning options for student support (including skills resource provision) rather than for subject learning, I wanted to increase my knowledge and understanding of how these types of technology might be used.

My research has been reported in the form of action research within a

particular distance education institution because this offered a way to use my experience to investigate different aspects and information within a changing and developing context, at the same time providing practical information about current student support options and how they might be implemented by an HEI. My study was founded on my own research work, but I have included additional information from across the OU, because during the past three years m-learning and the use of handheld devices as a method of accessing that learning have become a focus for developments that have influenced my own thinking.

I hope that the results of the research can lead to a better understanding of the place of m-learning within student services and the different ways in which the use of handheld technologies might benefit students and institutions. Changes in resources and services might improve learning skills, enhance the student experience, aid retention, and allow the efforts of staff such as tutors and study advisers to be focused on more complex issues.

Relevance of mobile technologies to higher education

Providing advice, guidance and study skills information and materials to students on a 'just-in-time' basis can offer individual students an accessible way to improve their learning, which is an important part of the work of student services in any HEI. However, there are always resource implications. There is a process for developing online and printed material, but new media necessarily imply additional work and staff expertise, as well as some evaluation of their merits: as Kukulska-Hulme reminds us, the "impacts of the

new mobile technologies need to be appraised and evaluated" (Kukulska-Hulme, 2005 p.1). In addition to general study skills, online and technical skills need constant updating if they are to be used as a medium for teaching and learning. Technology must not be a barrier between the student and the learning material and should ideally become invisible, so care must be taken to ensure easy access. While it may therefore be preferable to use methods that students already understand, at the same time new technological developments cannot be ignored if they offer useful alternatives.

Constructivist theory as described by Dart (1998) suggests that the social and collaborative activity in groups of students with their tutor allows learners to better develop their understanding of material, and that learners need to become responsible for their own learning as well as take control of it. Holmberg (1995 p.47) considers distance education to be a "guided didactic conversation" and cites the need for a personal relationship between a tutor and student, encouraged by communication that is clear, memorable, conversational and friendly in tone. I wanted to discover whether mobile learning could be a way to offer new opportunities to engage students in such a dialogue. These aspects were explored in the research study.

In the year this research began mobiles were already being mentioned by what seemed at the time to be highly unlikely and surprising sources, such as a beekeeper describing how to use an mp3 player for keeping hive records (Pedley, 2006), or the Queen's Christmas speech being made available as a podcast (Her Majesty The Queen, 2006). Handheld technologies have since spread at an amazing rate and become part of the global culture, and this

research is still current and relevant, with mobile technologies constantly in general and educational news. For example, many companies, like the British Broadcasting Corporation, now provide a mobile option for their web pages (British Broadcasting Corporation, 2009); you can find information about train times and journeys through a phone web browser or by text (National Rail, 2009); search for and book theatre tickets (iTheatre, 2009); the government's online service has a mobile option for all its services, and texts bring information about such diverse subjects as banking, jobs, travel, passports, NHS services or driving licence applications.

Structure of the thesis

Following this introductory chapter, Chapters 2 and 3 cover my review of the literature, firstly on the subjects of m-learning and handheld technologies and secondly covering student support. Chapter 4 explains the methodology and approach used in the research process. In Chapter 5 I describe the collection of data, and in Chapter 6 I discuss the results that have emerged from my research and describe a model for offering student support through the use of mobile technologies. In Chapter 7 I gather the conclusions arising from the discussion.

Aspects of the research process are illustrated by samples in the Appendices.

Chapter 2: Review of the literature - m-learning and handheld technologies

In this chapter I firstly review the literature across the field of mobile learning and in particular the developments in handheld technologies, how they are used in educational practice, the way that students use handheld devices, and some of the issues that have been identified. In Chapter 3 I address student support and how it could be facilitated by handheld technologies.

M-learning

My focus was primarily to consider how m-learning influenced "the learning and the experiences of the learner - experiences that include portability, privacy, spontaneity, situatedness and informality" (Kukulska-Hulme et al., 2005 p.1). I planned to investigate the learning that is enabled by handheld technologies and the issues around m-learning, and the potential benefits or pitfalls that have been or may be encountered. I use the definition of O'Malley et al. fairly wide definition of m-learning, that it is

> "Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies" (O'Malley et al., 2003 p.6).

As de Freitas and Levene (2003) describe in their review of the literature concerning different mobile devices, a place for learning can now be

anywhere and is not restricted to the classroom; nor, for distance learners, to the students' usual study areas where they access their books or online materials.

Ramaley and Zia (2005), having reviewed and researched the literature, regard learning as the "integration of cognitive, social and emotional development" and argue that it is important for new ways of learning to be considered (Ramaley and Zia, 2005 ch.8 p.17). M-learning particularly suits a constructivist approach as it relates to experience and encourages engagement with others through discussion, allowing knowledge to be constructed. In his book Morgan (1995) speaks of the challenge to encourage students to undertake such dialogue to promote a deeper approach to their learning, and since his writing this option has been further enabled by the use of e-learning communication. Green (2006) adapted learning theory and his own practical experience to identify ways to make learning a satisfying experience, and his resulting PEPPER approach has aspects of encouragement so that pleasure is associated with learning which is also connected with the learner's context, interests and needs (prepare, engage, present, practice, encourage, review). It fits with Keller's ARCS Model (as described by Green): the importance when interacting with students of getting their attention and offering something relevant to what they were doing that would increase their confidence and ultimately their satisfaction. M-learning has the capacity to support the four aspects of this approach (attention, relevance, confidence and satisfaction) (Green, 2006).

Information gathered from large and small-scale surveys of students using

information and communication technologies (ICTs) by Kirkwood and Price (2005) emphasises the importance of the underlying pedagogical purposes of that teaching and also that technologies should not be the driver, whatever forms of teaching ICTs might enable, although it is important to design courses with a consideration of learners' attitudes to and experiences of ICT. Salmon (2005), in her description of the development of a strategic framework for e-learning at the University of Leicester, also emphasises the importance of the learning design and notes that earlier emphasis on technology has given way to pedagogy, supported by evidence-based research and the continued need for high standards of quality, well designed assessment and the sharing of examples of good practice (Salmon, 2005). To fit these descriptions from Salmon and from Kirkwood and Price, the key aspect of m-learning must always be the educational foundation upon which it is developed, as with all types of learning. Green argues (2006) that although underlying pedagogic models affect the types of media to use and the ways students use them, a deep approach can be developed when the learning focuses on understanding key ideas and also allows time to reflect.

I now turn to authors who have addressed whether (and how) m-learning can support learning. Kukulska-Hulme (2005a), in a landscape review of the literature, describes how m-learning encourages motivation and self-evaluation; enables repetitive learning that helps to build skills; gives easy access to resources and information; allows multiple media recording; facilitates alerts and quick responses to need (Kukulska-Hulme, 2005a). The personalisation of learning material helps students to use it in the context of their own learning situation and can be partly addressed simply by wording, as

described by Mayer et al. who undertook three experiments with 62 college students, using computer-based multimedia materials offering narrated animation that was either personalised or impersonal. Following the experiments, questionnaire and testing, the findings suggest that the more personal and informal wording approach used in m-learning seems to aid retention and the transfer of learning to new situations, possibly because it primes deeper processing in its relation to self (Mayer et al., 2004). Their research showed that this could happen, for example, by simply including the word 'your' instead of using impersonal phrasing. I would argue that this more personal style of wording is already often used within distance education materials, both within courses and in communication with tutors, and that this particular style and tone is supported with m-learning which itself tends towards an informal style: according to Mayer et al. this could be beneficial for the retention and transfer of student learning. Note that feedback on the tutors and mobile learning study, described in Chapter 5, seems to support this engagement with the informal style provided by m-learning materials.

Stead undertook user trials (2005) with a wide variety of hard-to-reach communities of learners outside mainstream education and found that "Mobile learning works. We know that it reaches parts that other learning does not, and is especially powerful for disadvantaged learners" (Stead, 2005 p.8). He preferred it as part of a blended approach, and it could fit all stages in learning, whether to engage, assess, teach or practise. An m-learning summary by Attewell (2005) of the first three years of the wide-ranging M-learning project (which was funded by the European Commission, project partners and the UK's Learning and Skills Development Agency) described the

results of technology developments, learner research projects and systems trials and shows how m-learning can suit a variety of student populations because the range of technologies allows the implementation of various learning uses. For example, m-learning materials used with 80% unemployed learners with literacy or numeracy needs in the UK, Italy and Sweden resulted in participants wanting to try m-learning again, combating a previous resistance to ICT as well as enabling them to gain wider ICT skills. Attewell and Savill-Smith (2005) covered research from the M-learning project in Italy, Sweden and the UK, which included research reviews, user trials, and a survey of 746 UK participants. They describe one example which used m-learning for GCSE revision, in which subscribers received short message service (SMS) 'soap opera' styled texts that formed a narrative, with pointers to a revision website.

Although it has been twelve years since the Higher Education in the Learning Society report (also known as the Dearing Report) proposed that for the UK to be at the leading edge of world practice in effective learning and teaching it should "sustain a culture which ... challenges existing ideas and generates new ones" (National Committee of Inquiry into Higher Education, 1997 p.68), our current culture continues to embrace new ideas. M-learning consists of a set of new concepts rather than a single new development. Users have a larger role in the process, using social software to share resources; creating collaboratively using blogs, wikis, podcasts and micro-messages; sharing searches by tagging websites; and enabling a degree of openness that has previously been impossible. Alexander (2006) surveyed the new developments in innovative teaching and learning projects and discussions and wrote that

"The story of this wave of innovation ... is itself emergent and uncertain" (Alexander, 2006 p.39), and there is increasing interest and support in this field from not only profit-seeking global businesses such as Yahoo, Microsoft and Google and from a plethora of smaller companies, but also from national governments and educational providers.

Distance education has always used multiple media for course material delivery, which allows the choice of medium for the learning processes it best supports (Laurillard, 1993). The benefits behind the drive to digital technology are that it provides communication and community tools, alternative ways to absorb content and methods of transferring and storing material. These increase the options for access and use, but distance and disabled students can also gain inclusion rather than isolation. Cooper's 2006 case study was based on his experience of working at the OU, and explained that improving the design of materials to benefit disabled students would at the same time improve the design for all students: "Good design for disabled people is good design for all" because practitioners are encouraged to consider the best ways to move students towards the learning objectives of the course while improving the usability (again for all students) of the resources. Additionally, the resources should be customisable by users and should work with assistive technologies (Cooper, 2006). Phipps and Kelly (2006) based their paper on their own work in education with academics, with learning technologies, and with staff involved in disability and policy, and believe that these new technologies offer an addition to blended learning options to suit a particular learning need, because the support is flexible in time, place and type of media and may help in widening the participation of

those not currently in HE. They argue that resources should be tailored for individuals with needs as the main criteria to ensure that the material is truly accessible, and although they refer in their work to e-learning this clearly applies to m-learning. This theme of the importance of personalisation recurs in the interviews described in Chapter 5.

Mobile technologies are popular with users, media, government bodies and educators. It would be easy to develop material for these technologies but, as has been experienced through previous developments in e-learning, "... just because a tool exists, it does not mean that an *educational* need or use for that tool exists" (Sanders, 2006). The first point when designing any learning must always be to ask why it is needed, and not about the best method to use to make it available to the students. At the same time, Clark and Mayer's (2003) media comparison research found that while "it's not the medium, but rather the instructional methods that cause learning" the different media each offer unique aspects that can be used to advantage when designing learning opportunities and activities (Clark and Mayer, 2003 p.21) and these benefits can be factored in when designing learning.

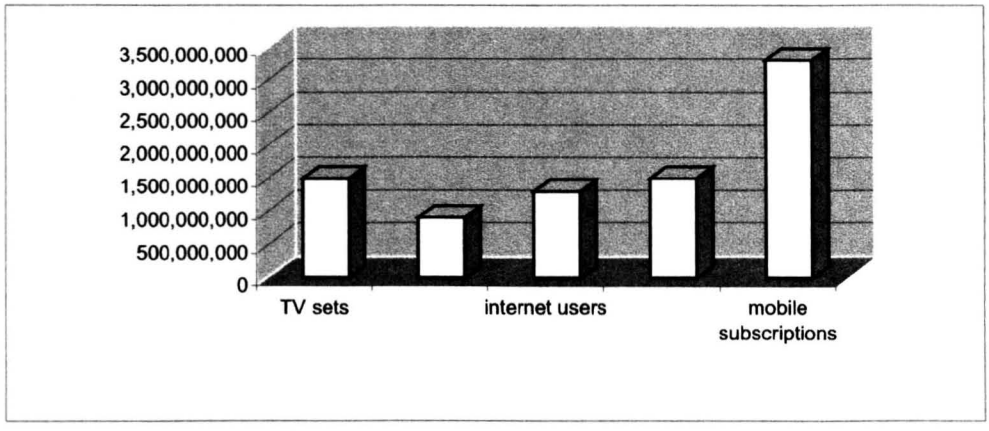
Developments in handheld technologies

Mobile technologies have very quickly become pervasive throughout education, from primary to tertiary education. The Department for Education and Skills (DfES - now Department for Children Schools and Families) e-strategy about the use of technology for learning prioritised the increased use of digital resources and support of innovation in areas where it could

successfully support "pedagogic quality, accessibility and safety" (Department for Education and Skills, 2005 p.7). This is a global trend: for example Keegan (2005) reviewed research studies in the European Union and in Africa that found that mobile phones are personal, trusted, cheap and easily used, although he felt that until telecommunications operators see education as a means of revenue, m-learning would not evolve. As HE institutions begin to use the technologies and the supporting infrastructure more widely, costs should come down and facilitate further expansion.

During the period of my research handheld devices have been in an accelerated stage of change, improving greatly in capability while becoming smaller and more widespread as the use of mobiles continues to increase. The US Annual Gadgets Survey (Horrigan, 2008) of a representative sample of 2054 adults in December 2007 found that 58% of Americans used a mobile phone or personal digital assistant for non-voice activities; 62% had experience of mobile access; 32% did at least one 'task' each day; and that the phone would be the hardest technology to give up (especially for younger adults), above the internet, TV or landline phone. Indeed, following Ahonen's review of the statistics concerning the usage of mass media (2008), she named the mobile phone as the seventh mass media, following print; recordings; cinema; radio; television; internet. The modern mobile phone has certainly developed very strongly against other mass media, as illustrated in Table 1.

Table 1: Mass media usage comparison 2007: data in Ahonen 2008a



In 2008 Ahonen pointed out that at that time there were 3.3 billion mobile phone subscriptions, equivalent to a subscription for half the global population of 6.6 billion people (although some people clearly have more than one subscription), and there were 2.5 times as many mobile as fixed landline phones (Ahonen, 2008a). These figures and proportions are so huge that they are hard to grasp - but the result is that SMS text messaging, a fast and discreet communication, is the biggest data application in the world, with 2.4 billion users in 2007 and a worldwide average (then) of 4 texts each per day: this means that there are three times as many SMS message users as email users. Ahonen suggests that mobile phones have seven unique capabilities that make them so popular:

"1. The mobile phone is the first personal mass media

2. The mobile is permanently carried media

3. The mobile is the only always-on mass media

4. Mobile is the only mass media with a built-in payment mechanism

5. Mobile is only media available at the point of creative inspiration

6. Mobile is only media with accurate audience measurement

7. Mobile captures the social context of media consumption" (Ahonen, 2008).

Ito included the use of ethnographic communication diaries in a review of Japanese use of mobiles and explains that in Japan these mobile devices, known as *keitai* ('something you carry with you'), are seen as important and quite personal everyday items that allow people to have not only their own space but at the same time to communicate easily with others during the moments they have at their disposal. *Keitai* support *nagara* ('while doing something else') (Ito, 2005), and we can observe this type of use on any street or public transport system.

We might question whether this popularity and frequency of use make the mobile phone more than a phone that is portable; whether handheld devices basically offer practical access, or whether they influence a student's learning in some different way; whether there is something particular and unique about using a handheld device that changes how people learn. The fact that so many students own devices can be exploited by an educational institution that is considering mobile options for students. Handheld devices are both readily available and designed for creative and social contact, which makes them different from what has gone before: previous media have generally been for broadcasting rather than communicating, and landline phones have never incorporated as many features and capabilities as mobiles now do. Even something as simple and seemingly limited as texting can be used positively, for answering quizzes that review learning, for reminders or suggestions, or

for keeping in contact. The OU SMS texting study described in Appendix 15 has shown that even these very short messages can be beneficial to learners.

Innovative practitioners and institutions can adapt and use devices to motivate students and provide alternative modes and places of learning, and while Wager argues (based on his work as assistant vice provost and registrar at The Pennsylvania State University) that a reliable, fast and secure wireless networking infrastructure is needed to offer personalised, available and consistent service, for a majority of people this type of infrastructure is now available. Input options include voice, keypad, writing recognition, camera or touch screen, enabling effective and convenient student-institution contact (Wager, 2005).

Mobile phones can be used for voice and text messaging, small games, web browsing, audio and visual media, and it is the combination of options that handheld devices allow which create the benefits. Colley and Stead (2004) firstly undertook trials and evaluation of several different mobile devices and approaches with learners, and followed this work by the development of materials based on their findings, combining pedagogy and the benefits of using new technologies in innovative ways. They explain that while the individual technologies and media are not necessarily rich, they can be combined in ways that can engage and encourage students. A student using m-learning might receive text reminders on their phone, look up something on a course website, communicate with fellow students, answer quizzes from a tutor, record some audio or take photos or video. Clark (2005) describes how 90% of secondary school children have a mobile, either using low bandwidth

with SMS text options or with high technical capabilities. Although learning design must consider content design against handheld constraints such as the small screen display, there are various options for information distribution that include pre-loading the device, web download or through a learning management system (LMS). Exploitation of the portable and personal dimensions can be motivational for induction, and excellent for reinforcement, for learning languages, diagnosis, self-assessment, task-based learning and location-specific aspects. Kukulska-Hulme et al. (2005) list some advantages of mobile technologies: they can be used to improve access, especially for distance students; provide new learning alternatives; and support institutional aims such as retention (Kukulska-Hulme et al., 2005).

A Joint Information Systems Committee (JISC) summary report on Innovative practice with e-learning argues that developing technologies offer new possibilities and challenges to be embedded into mainstream practice (Joint Information Systems Committee, 2005) and illustrates the position of technologies through a series of case studies from learner, practitioner and institutional views, showing how different technologies have been adopted in post-16 education. Practitioners and institutions have chosen widely available technologies that meet criteria of adaptability and potential for ease and different types of use, and acceptability to learners. The report outlines four learning perspectives (associative, constructive / individual, constructive / social, situative) and shows how particular mobile and wireless technologies can be used to support learning experiences, at the same time making that learning active and individualised for the student, and this aspect of personalisation is re-addressed later in this document.

Clark and Walsh (2004) describe mobile phones and mp3 players as socially acceptable (and I would suggest that for many they are now socially desirable) that provide efficient ways to use the spoken word, offer a searchable and large capacity under user control, and allow reflection (Clark and Walsh, 2004). Mobile technologies offer real benefits to students with disabilities as they allow portable, alternative methods of access on devices that are part of the social norm, rather than being exclusively for the disabled, with features that include text-to-speech recognition. These benefits are particularly important for distance education providers, through which many disabled students can access higher education no matter what their physical constraints may be.

Handheld devices in practice

Porter's paper considers some key points and presentations about practice, technology and innovation from the 2004 Association of Learning Technology conference, and in a case study summarises the JISC approach in the application of developmental work to stimulate innovation, giving examples of the programmes and projects that were implemented. In her paper she asks

> "Should technology stimulate innovation in practice or should technology support practice? Or is it able to do both? At what point should innovation become 'embedded' into practice and how can this be achieved?" (Porter, 2005 p.239)

This is still a difficult question to answer at this stage in the development of m-learning, but it seems clear from the literature that m-learning technologies offer something different from other 'tools' and are also stimulating the adoption of new ways of working with learners. At the same time it is possible to develop one's practice to make the best use of innovations in technology, and perhaps the choice of approach depends on one's own experience and preferred styles of practice development. As Doughty notes (1996), it takes time to discover the benefits of new technologies and for staff to learn how best to use them. Higher education has been working through this state of pilot and small-scale investigation on the way to adopting mobile technologies for more widespread learning use, and some examples are outlined in this section. Certainly not all technologies live up to early promise but Weller (2002), based partly on his experience of developing an innovative online course and discussing the earlier technology of the internet, states that it was different from other promising technologies for education because of its ability for interactivity and personalisation, and because it is a sustaining and disruptive technology (in the ways it can force change) with a new audience that can cause alterations in an organisation. Importantly, it is easy to use and because of this is used throughout society "mainly because it is a communication medium" (Weller, 2002 p.18). From my reading and research I would argue that handheld technologies have similar attributes.

Savill-Smith and Kent (2003) produced a research report resulting from an in-depth review of the literature conducted by the Learning and Skills Development Agency as part of the m-learning project. The report found a

variety of benefits in using palmtop computers for learning:

> "they assist students' motivation, help organisational skills, encourage a sense of responsibility, help both independent and collaborative learning, act as reference tools, and can be used to help track students' progress and for assessment" (Savill-Smith and Kent, 2003 p.4).

Thomas (2006) describes early use of iPods in HE: in 2004, first Osaka Jogakuin College in Japan and then Duke University in the US issued iPods to first-year students, partly to encourage mobile learning. However, students at both universities thought this was more a marketing tool than of educational benefit. Thomas reports on research with English-language students who were required to use the devices, but even though the iPods were part of the course design it was found that only 26% of students thought them beneficial, with most using them for music and few for study purposes. Students noted that faculty members had not made effective use of the iPods, which illustrates the elemental importance of pedagogical considerations (Thomas, 2006). This clearly shows that availability and accessibility of mobile technologies are not the important criteria in developing their use: underlying educational principles must justify their incorporation or students will not benefit.

Paustian (2004) described a study at Des Moines Area Community College where handheld pocket computers were required for many of the 1000 students, who (more successfully than at Duke University) used handheld devices to access course and administrative material from a web portal:

wireless infrastructure, central data storage, and automatic formatting for small screens were important aspects. Students also used the devices for surfing the web, accessing email and text messages, as well as playing games and listening to music. This study illustrated how handhelds can become tools to be used for both work and leisure. Similarly, Bull and Reid (2004) described a small-scale study, using a questionnaire with 17 volunteer MSc students, asking them to indicate whether they would be likely to use certain types of revision material. This was a small sample and had only a 53% return rate, but it gave the researchers information about whether some students would be interested in such materials. Those who responded were generally positive about the potential use of a mathematics program that would follow up course-work, offer additional individualised revision material, build on students' knowledge, help them to successfully develop and re-test their skills. Other examples abound: Hoare (2006) described Leicester University's distance learning course for engineering and IT students, which includes ten-minute 'profcasts' and hour-long audio lectures. Separately, two-minute Maths Tutor video tutorials, which were available for use on mp3 players or PCs, complemented other learning materials and fitted well within student life (Hoare, 2006). Educause Learning Initiative (2006) listed mobile phone uses that included 'Ask the Techies at Ohio University', a weekly video podcast on technology subjects which are mobile learning objects that can include text, diagrams and animations; short quizzes; polling students during a lecture; reference materials; or taking part in phone-based assessment (with a voiceprint used for identification). In Taiwan a study by Liu et al. (2003) found that the integration of mobile devices and wireless

communication and network technologies reduced work time, engaged students in learning, allowed monitoring of their work, facilitated collaborative learning and enabled learning processes to be recorded in portfolios.

There are major HE development research studies being undertaken into m-learning across the globe, often funded by governments and leading educational partnerships. A few examples include the European Cooperation in the field of Scientific and Technical Research (COST) that instituted a three-year multidisciplinary research project with the aims of "exploring and developing new methods, models, techniques, strategies and tools" in the field of mobile radio communication systems, to integrate m-learning (COST, 2006 p.2). Taylor and Evans (2005) describe MOBIlearn as a multinational research project on the design of pedagogically sound m-learning using scenarios as a frame of reference, to define evaluation and keep a learner focus, which used scenarios (initially contributed by consortium members and successively refined) both to help envision the potential mobile learning environment and also to begin to identify what the users would require. Transforming and Enhancing the Student Experience through Pedagogy (TESEP), a 2005-2007 Scottish Funding Council project, considered student engagement as one of its key underlying principles, with a shift to social-constructivist, learner-centred achievement where students learn with peers through discussion and feedback (Sanderson, 2006). Planned methods of evaluation included interviews, focus groups, workshops and studies of the impact of the project through reflective diaries and case studies (TESEP, 2006).

In an online survey and interviews about the use of various mobile devices, carried out with 57 respondents of the alumni of online education courses, Pettit and Kukulska-Hulme (2007) found that mobiles offered opportunities for learning at times and places where it would previously have been impossible, although there were many individual differences across groups of users. Rather than solely responding to proven usage patterns, educators are advised to discover new ways of enabling learning through new methods. Kukulska-Hulme and Pettit (2007) describe another study that offered hands-on experience of smartphone technology to 40 volunteer practitioners. Each group of 20 used the device for five months and had three workshops (during each of which they completed a questionnaire) to stimulate their ideas for using the devices, as well as a motivating 'buddy' support system. Investigation showed that some peer learning took place, but the devices were used for data collection rather than communication, partly because of cost and partly because most participants worked in the same building. These studies seem to show that it can take people time to develop their use of new tools: and they need to have good reasons to do so. Technological trends are driven through money-making retail, business and leisure, but Traxler (2005) explains that projects and niches are where innovation begins. Small investigations like those mentioned above have been able to highlight positive and negative aspects of mobile learning that can help educators to design the use of such tools to the greatest effect, although Kukulska-Hulme (2005) emphasises that

> "Mobile learning is now moving beyond short-term, small-scale pilot projects and is ready to tackle issues of scale, sustainability,

> accessibility, evaluation, cost-effectiveness and quality in the mainstream of education and training, blending with other forms of delivery and support" (Kukulska-Hulme, 2005a p.3).

These new methods that are being developed may better support students' ways of thinking and understanding what they study. Some ways in which the OU has moved through projects and research and added mobile learning into the learning blend are described in Appendix 15.

Student use of m-learning

Prensky (2001) summarised a new view of young people who were growing up using digital communications as part of their everyday lives.

> "Today's students - K through college - represent the first generations to grow up with this new technology. They have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. Today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games (not to mention 20,000 hours watching TV). Computer games, email, the Internet, cell phones and instant messaging are integral parts of their lives" (Prensky, 2001 p.1).

Although it is difficult to identify the research methods behind his work, Prensky's term 'digital natives' is now part of the educational vocabulary, and much research supports the view that those under 27 years of age have a

different approach, and indeed different ways of thinking, to those above that age who Prensky called 'digital immigrants' and who have to learn the language of technology. Tapscott (2009), stating that his work is based on thousands of interviews as well as academic and government input, is almost overwhelmingly positive about the skills and abilities of the 'Net Generation' (those born after 1981) in making use of the new technologies and the internet, and suggests a model of education that focuses on the learner and encourages collaboration, which can be facilitated by handheld technologies and will prepare students for the workplace where teams are increasingly important. Windham (2005) uses her own student Net Generation experience and reports that younger students see themselves as driven to succeed and adept with technology, "a generation of learners by exploration" who enjoy immediate communication and "tend to learn things ourselves, to experiment with new technology until we get it right, and to build by touch rather than tutorial" (Windham, 2005 ch.5 p.6). The 'natives and immigrants' metaphor has been enthusiastically adopted but can lead people to ignore the subtleties of individual experience and need. We must therefore be wary of some of these reports, as Bennett et al. (2008) (among others) have argued: for example, just because people see themselves as adept at something does not mean that this is true, and 'technology' is a term that covers a multitude of options. Younger students such as those reported by Windham are likely in fact only to be adept with the particular technologies that they use: we must be clear that there will be a wide variety of skills as well as motivations, and these can of course be affected by their access to different devices. Indeed Smith and Oliver (2005) used a small-scale study using pre-course and post-

course questionnaires together with observation of laboratory sessions. They warn that while students may have excellent skills with some technologies such as gaming, they may not have the ICT skills needed for their studies, so care is needed in designing learning that uses a variety of technologies. A study by Margaryan and Littlejohn (2008) also supports this view, using a paper-based survey of 160 students and 8 interviews at two UK universities in order to ensure responses from a broad range of students, and no evidence was found for differences in ICT use for those under or over 27, particularly within the field of learning. It was felt that students reacted to their lecturers' attitudes about ICT rather than 'demanded' new technologies. Indeed, it was considered that students as well as tutors lacked ICT skills, and it cannot be assumed that young people have good technological skills nor that they know how to exploit collaborative technologies (which are still very new) for their learning: "many young students are far from being the epitomic global, connected, socially-networked technologically-fluent digital native who has little patience for passive and linear forms of learning" (Margaryan and Littlejohn, 2008 p.22).

Whatever the possible age-related differences around technologies, Table 2 below shows a high level of mobile ownership and use for groups of digital natives and for a restricted age sample of digital immigrants, and that in fact the digital immigrants in Margaryan and Littlejohn's study (2008) made greater use than younger students of their mobile phones for each option of informal learning, text messaging and mobile searching.

Table 2: Ownership and use of mobile devices, early 2007: data in Margaryan and Littlejohn, 2008 p.9

	digital natives (age under 27)	digital immigrants (age 28-38)
owned mobile phone	100%	95.6%
informal learning	68.2%	78.3%
text messaging	67.4%	69.6%
mobile Google search	75.2%	78.3%

A recent Ofcom report on the communications market (2009) showed that 85% of the over 65 age group had a mobile phone, so it is clear that these devices are in no way limited to younger people. When someone has access to and interest in technologies, their age will not be of prime importance and they will become part of a continuum of people who are engaged with those technologies, so to this extent the native / immigrant dichotomy is misleading. The Ofcom report also points out that while generally 83% of adults use text messaging, 56% voicemail and 52% take and send photos, less than 50% use the other advanced functions on mobile phones, so educators cannot assume that students possess the skills to use the facilities offered by even their own handheld device. Eight million people accessed the internet through their phone in the first quarter of 2009, but while this was only 16% of adults, it was an increase of 42% over the same quarter in 2008 (Ofcom, 2009) and this access appears to be a developing market.

Interestingly, Prensky recently updated his thoughts about the different types of people using digital technologies. Moving away from the rather limiting

categories of digital natives and digital immigrants he now suggests that we are moving towards the need for "digital wisdom", a term he uses when describing those who use digital technologies effectively to provide access to data and promote analysis, perspectives and insights, and he notes that "many digital immigrants exhibit digital wisdom" (Prensky, 2009 pp.3-5). The investigation of Trinder et al. (2008) used desk study, surveys of 160 students and eight follow-up interviews into how they used new tools and found ubiquitous ownership of mobile phones that offer users photos, text, music, digital storage and web access. The research team describe a widening gap that was developing between the educational culture and the learners' culture: although staff were worried about security and personal space, mobile learning was found to allow self-direction, collaboration, sharing and formation of communities, all of which are excellent graduate skills.

A key consideration for distance education institutions is that because students probably already own a handheld device, only the input and collection parts of a communication system such as SMS texting need to be provided. Previously institutions had to consider issuing particular types of handheld technology to ensure that their students had access, and this is an important shift during the difficult financial situation in which educational providers currently operate.

Garcia and Qin (2007) carried out a survey of four different age groups in Northern Arizona University and found that while the 21-25 age group was more comfortable with technology than older students, in fact all groups were happy with traditional learning models. These authors suggest that learners

would benefit if educators used more novel media and approaches to encourage independence and self-regulation (Garcia and Qin, 2007). I would consider that while it is likely that some younger students will neatly fit the 'digital native' description (as researchers elsewhere have found), other young students will have more limited experiences, expertise or interest. In either case, it is worth using these technologies for a number of reasons, for example because they can encourage independent learning, they can be engaging, the current world demands digital literacy, and university students must be equipped for new ways of working and communicating which increasingly use these types of tool. Edwards et al. argue that technologies are important within education not only because they are available and can be used anywhere, but also because students will use them in the future when they become part of a skilled work-force and help to support the economy (Edwards et al., 1993).

However, it is important to remember that the workplace environment and tools also change at speed and students will not be using the same tools in their work in five years' time that they might use now. As a personal example, I began work at a time when electric typewriters were fairly new and when multiple documents were produced using manually powered duplicating machines. An early photocopier was a radical office tool, and word-processors and office computers came much later. This example helps to illustrate the fact that education cannot necessarily prepare students for the actual work they will do, but should equip them with a set of transferable skills so that they can be adaptable, learn what they need and be prepared for a changing environment, in which they will always need the 'soft skills' such

as communicating and collaborating effectively with others.

Other examples of student studies have included Mifsud (2004) who reported that, in a study of 26 US 12-year-old school pupils using observations, informal interviews and concept mapping, they used handhelds at home and in the car, to and from school, for assignment work and for games. Savill-Smith (2004) described a widespread survey using clipboard surveys in 7 UK locations, which found that in the UK young people were interested to use mobile phones (if the learning was sufficiently engaging) to improve their literacy (49%) and numeracy (44%) skills. A desktop survey and information gathered at the MLearn Rome conference (Valentine, 2004) reported that 16-19 year olds and young adults educated to Levels 2 or 3 had the greatest interest in using their mobile phones. Taylor describes how MOBIlearn's large-scale worldwide research and development project showed how students form their own networks to support learning and new tools prompt new ways of working, with communication helping reflective learning (Taylor, 2004a). Prensky (2004) notes that effective methods of learning are "listening, observing, imitating, questioning, reflecting, trying, estimating, predicting, speculating, and practicing" (Prensky, 2004 p.2) and these are all supported by mobile devices (many of which we must remember are in effect pocket-sized computers), always available to the learner and which now include such a variety of features. Scanlon et al. (2005), due to the lack of relevant literature on mobile technologies for science learning, reflected on a variety of projects in mobile learning within schools, HE and in leisure environments, and point to the importance of the mobility of learners as a particular advantage for fieldwork, in the workplace or places such as museums, where the handheld

device offers convenient choices such as developing, searching for and recording information. They also describe how the interactions between people, the tools they use and their environmental settings accord with activity theory (Scanlon et al., 2005).

Information technologies have been used as an additional resource in education, and handhelds are now being used increasingly from primary school onwards. Those growing up and learning with these easy-to-use mobile devices (and for whom the technology has importantly become transparent) will surely expect to use these technologies at university level: as Phillips and Kelly state (although concerning e-learning technologies), this "could mean that the next generation of adult ODE students also will expect to use all the learning technologies. This expectation may be the real challenge for adult educators everywhere" (Phillips and Kelly, 2000 pp.24-25).

It is certain that there will be further change as future students grow up with devices we can hardly imagine, with wireless computing and related devices leading to "new instructional and social patterns" (Hartman et al., 2005), with learners perhaps preferring and perhaps expecting an exploratory rather than instructional learning style. Blomfield (2006) describe how primary students at a digital creativity conference demonstrated their extensive and practised usage of m-learning at school. Hartman et al. (2005) discuss how a survey into online learning experiences illustrated the differences between responses from Baby Boomers (born 1946-1964), Generation-X (1965-80) and Net Generation (1981-94), which included their learning engagement, interaction value and changes in their approach to learning. The challenging Net

Generation style is very different to older students, and we have yet to meet the next generation of students who are growing up with mobile devices and who will have their own approaches (Hartman et al., 2005).

Carey et al. (2002) set up an international study of freshman university students that showed that while those with most experience of technology have the most positive views, the quality of that experience is key, although more access generally means more positive attitudes. Kvavik (2005) undertook a large-scale survey of US students, 95% of whom were under 25 years old, and found that influential factors on computer use are academic requirements, class status, gender and age: although students believed they had the requisite technical skills, qualitative data showed some of those skills were quite basic (Kvavik, 2005), which supports similar points made earlier in this chapter.

Radosevich and Kahn (2006) explain that "... as technology changes, so do the opportunities of instructors to empower students to engage in successful learning" (Radosevich and Kahn, 2006). Salmon's five-stage model of e-learning (that can be applied to m-learning) builds the learning experience for students and encourages their independence. She argues that e-tivities are "motivating, engaging and purposeful; based on interaction" (Salmon, 2002 p.1) and her research included input on such activities from practitioners. Rutter (2006) identifies that some important skills supported by m-learning were the sharing and support which enriched the learning environment and which led to improved learning for the student. A Netherlands study by de Vries et al. (2005) used brainstorm sessions with stakeholders and categorised

the responses. They found that e-learning firstly allows increased access for the students, followed by tutors adapting to student demand, and that m-learning could address the support problems related to the process of learning.

Despite the caveats mentioned earlier that we must not assume that all students can manage all digital technologies, it is nonetheless clear from much of the research that many students of all ages are readily able to use technologies to their advantage. In fact Attwood (2007) describes how Hertfordshire University employed student mentors to help staff use the online learning environment for podcasting and improved presentations because "From the start, our concerns about StudyNet were not whether students would be able to use it but whether staff could manage" (Attwood, 2007). I have no doubt that society changed when personal computers were adopted in homes from 1985: now a large part of the population is enthusiastically adopting mobile technologies and we can expect further change. If people already have experience of new technologies when they begin to study, they will accept and may expect that these may be used as part of their study media. Mobile equipment is considerably cheaper than computers, particularly for low-level models like mp3 players or simple phones that receive SMS but do not have all the added media options, although some access to computers would also be needed. Beetham (2004) conducted a review of elearning models in order to develop an e-learning framework and emphasises that, apart from supporting students, new technologies also allow practitioners to share knowledge, and I would expect that this type of sharing would at the same time improve staff skills and their

understanding of the possibilities of mobile technologies. This aspect of technology adoption has increasing importance within an institution: not just how to engage these m-learners, but how to ensure that staff are themselves aware of and able to use developing technologies, as well as to become engaged in developing the materials and environments that will suit their students' needs.

The studies mentioned above are necessarily just a few of the many available. Many illustrate that although they may already possess and use handheld technologies, students need to have a positive experience in learning through technology in order to see its worth. They also show that m-learning can offer great benefits because of the additional accessibility and opportunity that is enabled.

It has been a concern to me that the use of desktop computers in distance education caused students to become tied to a place of study, which had not previously been the case. Whereas previously an advantage of distance learning was the flexibility of studying anywhere at any time, computers changed this to some extent, particularly for those who were studying online courses where most material was accessed by computer. The availability of satellite or wireless connections and handheld devices restores the flexibility of study place, and thus time, that was once an important and appreciated feature of learning at a distance.

Issues in m-learning

Because my research addresses the use of mobile devices by adults in distance HE and more specifically for the area of student support, I have not considered security, privacy, copyright or the disruption that can be issues for those in schools or classroom teaching.

Some issues about the technologies are necessarily technical, such as extended battery life and problems with bandwidth, but these aspects are improving rapidly and have become less important during the period of my research. A major difficulty has been the lack of standards across different devices, which has particularly affected the design of learning objects to suit a variety of handheld devices, but this aspect too is now beginning to be addressed, and the most useful alternative approach at this time is to present materials through a mobile web area. De Freitas and Levene (2003) found in their review that while the issue of health risks in mobile phone use has been partly addressed in the past few years, the issue seems to be largely ignored by many users. Some limitations continue around screen size, input keys and buttons, performance and connectivity, but screen resolution is now high and thus clearer to view, while new ways of navigation have developed that make devices more intuitive to use. Mobile technologies evolve continually, partly in response to consumer demand for increased capability and usability.

Additionally I assume that distance education providers are unlikely to be in a position to supply such devices for their students, and that students are coming into HE having already chosen a device for their own use. In this case

they have decided on the screen size, input options and capabilities that suit them, and although they may not necessarily have considered its use for their education they should be comfortable with the way that it can be used in practical terms. Consequently, even the technical limitations mentioned in the previous paragraph become less important in this particular context.

Other issues apply to the use of m-learning within education. Evans (2005) notes, in a Landscape Study into FE and HE use of technologies, the need to understand the differences in younger students who particularly seem to benefit from social networking, contextual learning and increased practice. It must be remembered that faculty members who teach or develop course materials may include those who have not yet used newer communication technologies, which makes it difficult for them to appreciate the different outlook of mobile technology users. Taylor's review of MOBIlearn research noted (2003) that there was resistance to m-learning from educators and that they failed to realise the extent of the changes taking place in knowledge, communication, informal learning and young people's expectations.

Speed of change brings support problems for new and existing technologies (Educause Learning Initiative, 2006) as institutions and staff attempt to adapt their teaching provision. Salmon (2005) found that the development of e-learning was particularly difficult within institutions with complex procedures and traditions and consequently needs a strategic framework, and I have no reason to expect the development of m-learning to be any different. However, Salmon also found that the introduction of the new technology

could be facilitated by choosing easy-to-use technologies that staff can use directly, and again this seems like a suitable approach for m-learning.

The annual Horizon Report from Educause describes the work of a large-scale research project, launched in 2002 to predict the emerging technologies that will most affect HE over the next five years, using published resources, current research, discussions with experts and the expertise of members of the New Media Consortium. The main changes are expected to be towards dynamic knowledge creation, social computing and collaborative distance working and community development, although personalised content information literacy is not developed by every student. However, the issue of intellectual property rights has become a complex question in the development of learning objects and the sharing of knowledge, and may be a problematic issue in the large-scale use of new technologies (Educause Learning Initiative, 2006) unless it can be resolved.

Roberts (2005) used one-to-one interviews with fellow Net Generation students, and found that students expect technology to provide access to information or a means of communication, and that customisation will allow adaptation to the individual's needs. McNeely (2005) is another Net Generation student who uses anecdotal evidence to describe how his peers are generally digitally literate (though we have seen that there are exceptions and their skills may not transfer to more general computer applications) and how they tend to think of what they can achieve with technology rather than about the technology itself. They look for immediacy, engagement, visual experience and social connectedness, have visual-spatial skills and enjoy

discovery. They learn by doing but want human interaction and a practical relevance in their study (McNeely, 2005). Oblinger and Oblinger (2005) urge us to find what engages these learners, and in what ways IT can make their learning more successful. However, Ramaley and Zia (2005) explain that although there are differences as well as similarities between these students and those who produce course materials, technology promises better communication, lower costs and new ways of interacting with others that do not replace but can enrich traditional learning (including enhanced group work, which is valuable within distance learning). They also argue that there is often a gap between what researchers discover about learning and what faculty members who develop the materials and curriculum and who do the teaching actually understand and practice with their students (Ramaley and Zia, 2005).

A practical issue in learning design is creating learning objects small enough to fit handheld devices. Colley and Stead (2004) describe their work in designing quizzes and games to create a coherent topic out of such small bites. Danielsson et al. (2004) describes an ethnographic study that used meetings, observations, field notes and video and audio recordings, in which learners helped to design materials, using their knowledge of the technologies and allowing insight into their interaction with materials. This learner-centred design is more individualised than user-centred design and these studies showed how students could usefully become part of the developmental process of mobile learning environments when their expertise with personal technologies resulted in students becoming defined as expert users.

Such differences between the students' and the educators' knowledge, use and understanding of handheld technologies may be a barrier in m-learning development, until such knowledge can be more fully disseminated throughout the distance education community. Several of these studies also illustrate the need for staff development at a number of levels, from awareness to best practice, and from technical skills to pedagogical approaches, a theme to which I return in Chapter 5.

Stone's (2004) review of the literature identifies the risk of losing the original pedagogy of learning objects as they are adapted and reused in mobile environments although Hedberg (2006), following a literature review, talks about the future of e-learning and believes that the integration of new methods can be helped when suitable technologies are identified and time is allowed for planning and development, requiring a re-think of learning activities and "the right tool for the pedagogical task" (Hedberg, 2006 p.182). In developing educational material, faculty rightly put learning goals at the forefront, and Taylor (2004) emphasises the primary need for "evaluating the validity of the tasks" before looking at technology. Once again the learning aim is the key, before undertaking media development or use of technology.

Key points from review of the literature: m-learning and handheld technologies

Returning to my research questions, this section of the review has addressed questions 1 and 2.

1. What is the relationship between mobile learning technologies and the development and enhancement of student learning in higher education?
2. What are the main drivers and barriers that encourage or dissuade students from making use of mobile learning technologies, and how might these influence the nature of the student support offered by higher education institutions?

As described in Chapter 1, distance education has always depended on technological media and modern distance education makes full use of developing digital technologies: the pervasiveness of handheld devices, and particularly of the mobile phone, means that students already possess the means of access and that distance education institutions should be able to focus on developing system-independent ways of communicating with students through a mobile web interface and on providing learning objects or educational services. This benefit could probably not have been predicted when these devices were first introduced, as it would have been hard to understand how quickly they would be popularly adopted by all age groups due to the convergence of media options and facilities.

Mobile phones in particular allow learners to access information and material wherever they are, and already offer rich media, communication options, global positioning and internet access, for creative and collaborative use. People in isolated areas, those unable to attend even occasional tutorials or day schools, or those who cannot afford a landline phone or a PDA, may well have a mobile phone.

The literature has identified ways in which learning can be enabled by well-

designed activities to suit handheld devices. Much of the evidence has generally related to younger users of technology, but some has shown that older students equally benefit when there is an underlying purpose and an institutional culture of support. This is of vital importance because distance education institutions, although with an increasing percentage of younger students, also have many mature students.

The review has also shown that there are many aspects of working in education with new technologies that have ramifications for the development of staff: for example, students who received the iPods introduced into Osaka Jogakuin and Duke Universities did not consider that the staff made the best use of them to facilitate their learning, and elsewhere Doughty, Prensky and Attwood point out that students and staff have widely differing knowledge and experience of these developing technologies.

However, the technologies themselves are not the most important aspect of this research and the fundamentals of education apply whatever the circumstances. As Salmon identified in her research into e-learning:

> "If we avoid sliding assumptions about pedagogy around from one technological environment to the other then we quickly find out that teaching online has almost nothing to do with computers and everything to do with time, motivation, knowledge and the new agency of cyber-experience, as well as good, appropriate teaching" (Salmon, 2005 pp.214-215).

Additionally. this review of the literature enabled me to learn more about the ways in which different research methods were used to gather data and explore ideas, and this reading influenced my own choices. For example, I have described Bull and Reid's (2004) small-scale survey in order to explore student perceptions about the likelihood of using certain options in the future, and I decided to use a small-scale questionnaire as an initial investigation when I began my research. Elsewhere Kukulska-Hulme and Pettit (2007) explained their use of workshops and ongoing self-help participant groups in their study of smartphone use, and I used a similar approach to help support tutors in the tutors and mobile learning study.

Various authors, including Salmon (2005), Ramaley and Zia (2005) and Alexander (2006) reviewed ongoing projects elsewhere, and I found it useful to do this for ongoing developments in the OU in the field of mobile learning and technologies. Some of these were associated with my own work at the OU, and they illuminated my understanding and influenced my thinking about mobile learning and the use of handheld technologies. Writings by Wager (2005) and Cooper (2006) incorporated information about their own working experience, and similarly I have included a summary of these developments as Appendix 15.

I also knew that the use of several different methods would be beneficial in gathering a wider range of data. Details about the methods I chose are given in Chapter 4: Methodology.

In Chapter 3 I next review the literature concerning student support.

Chapter 3: Review of the literature - student support

In this second chapter covering my review of the literature I address aspects of student support, a main theme of my research.

Definitions of student support vary, but again I use a broad definition that includes all that helps students to study as distance learners, outside the actual development, production and delivery of subject learning materials. In the distance education context this includes all the supportive and administrative services that surround and underpin the course and its teaching. Many of these processes are somewhat hidden, but others include direct contact with students and their queries and problems. Phillips and Kelly (2000) base their work on their own extensive experience in supporting students and note that the advice and guidance given as student support were "developmental factors in the whole learning process" throughout the student's entire time with the institution, and that students should be able to access support as and when they need it (Phillips and Kelly, 2000 p.18).

In considering how institutions offer student support, Kuh et al. (2007) discuss the benefits for students when "Institutions that foster student success provide stimulating, engaging classroom experiences that encourage students to devote more time and effort to their learning and help them develop good study habits" (Kuh et al., 2007 p.102). For the purposes of distance education, I take the description by Kuh et al. to include the type of 'classroom' that can be provided through digital and web-based communication options such as

forums and virtual classrooms. Kuh et al. describe an ideal institutional culture to be one that prioritises student success, sets high standards of performance, financial and moral support, facilitates the provision of active, learner-centred work with other students, and enables effective communication with faculty, while using engaging pedagogies and electronic technologies. Their 2005 analysis of twenty US institutions within the Documenting Effective Educational Practice (DEEP) project notes, however, that the provision of engaging courses and associated resources is "not sufficient to promote student success. Schools must induce large numbers of students to use them" (Kuh et al., 2005 p.268). For example, when new virtual learning environment (VLE) systems are introduced, staff across the entire institution must be encouraged to include the new options into course design and explore ways to use them with students. This too has implications for staff development and a programme of information and increased awareness of educational benefits must be implemented; we have seen in Chapter 2 that staff development is an issue in connection with m-learning tools and technologies.

Mills (2003) uses the literature and his working experience and describes the totality of support offered by an institution, including recruitment, retention, widening participation, course and tutor support. Tait (2000) similarly reviews key literature and the open and distance learning environment and explains that student support has a number of primary functions: cognitive, through course materials and other resources; affective, in the environment through which students work; systemic, through administrative procedures and systems that students find friendly. These functions cover the entire student

timetable from enquiry to graduation, and the tutor's skill and engagement with learners is of key importance. Based on Tait's work, members of the Personalised Integrated Learning Support (PILS) team in the OU's Centre for Excellence in Teaching and Learning (CETL) looked at retention issues in student support through a number of pilot studies of blended support, and suggest the primary functions of "Affective (emotional development), Reflective (motivational support), Cognitive (academic/skills support) and Systemic (practical support)" (Atkins and Beard, 2008 p.12). They found that institutional knowledge (such as student performance, survey feedback, reports from tutors, support staff and academics) can be used to help offer students a personalised service. The themes that emerged from their mapping included motivation, confidence, learning and skills, identity (in terms of being part of a community) and employability: in practice these are all supported by various parts of the institution.

Earwaker (1992) reflects on his working life in supporting students and argues that "Helping and supporting students is not some kind of 'extra' which may be tacked on as supplementary to the educational experience, but an integral element in the educational process" (Earwaker, 1992 p.x). He posits that higher education aids three types of inter-related development: self-development, from their initial vulnerability to finding ways to settle into a new way of learning; study development by becoming aware of their own learning processes; and career development. He describes how students learn their new role and institutional rules, and that an HEI can help them to adjust (rather than withdraw) by providing a suitable environment. I agree that institutions tend to assume that students not only know how HE works but also

that students can discover for themselves the important procedures and policies that govern their education, and consider that making these things explicit can save students the frustration and confusion that can result when institutions work with implicit and unexplained systems and processes. Earwaker supports induction into such rules and ways of working, and promotes proactive contact (covered later in the section on retention) and this approach is supported by Moore and Murphy (2005) who argue, based on their working experience and input from colleagues and students, that student feelings can affect their attitudes to study (Moore and Murphy, 2005). I particularly appreciate Earwaker's shift away from the traditional issues of 'problems' and 'remedial work' towards a position of "how to enhance the quality of the whole student experience" (Earwaker, 1992 p.133).

Wisker and Brown (1996), in a book that addresses various ways that staff can best support students in HE, warn that if an institution offers poorly-organised support this can affect the numbers of students that join it and hence its market share, and that support is particularly important on modular courses and flexible learning but is "not a cheap or easy option" (Wisker and Brown, 1996 p.178).

Clearly new students will develop and change and will encounter unpredictable difficulties and problems, and educational institutions could do more to clarify to new students the potential difficulties of a student's learning journey. Learning is often a struggle, but now that HE has become almost an 'entitlement' (rather than a privilege) within our customer-led society, it may be hard for students to deal with two opposing tensions: the

general expectation that students can cope and achieve within HE, and the reality for many students of the difficulties that they will encounter.

Clayton-Pedersen and O'Neill (2005) consider HE developments in technologies from their own experience, illustrated with student examples, and explain that because students' future careers will depend on their adaptability and ability to use information and technology, they must learn such skills as working in teams, finding information from different sources and linking it to assimilate their knowledge. Employability is a major draw for students undertaking education, and m-learning may provide an alternative medium for improving some of these transferable skills.

Development of study skills

In a book covering the competences and confidence that enable HE learners to study successfully, Tait and Knight write about students' need for "reassurance, support, academic guidance, induction into the methods and habits of independent learning" (Tait and Knight, 1996 p.11) so they can make their way in independent study. However, despite the fact that thousands of students study each year, it appears that institutions still have idealistic expectations about how they actually effect their study. Institutions offer a certain 'best practice' type of advice, but for most students this is probably unrealistic. Simpson (2008) relates how he met an academic

> "who told me that for years he'd advised students about their studies by saying things like 'find a quiet place to study, set aside definite

> times each week, keep up with the work' and so on. "When I finally took a course myself I did none of that" he said. "I never found a quiet place, I studied in whatever little bits of time I found, I never got into a routine and I was always behind"" (Simpson, 2008 slide 6).

I suspect that many distance learners would find this description matches their own approaches to study.

Taylor (1984) reviewed the literature to follow the development of thinking about study skills. She showed how earlier writers such as Rowntree focused on the need to *learn* study skills, but later the importance of learning *how to learn* became more important, as outlined by Gibbs. She sees 'study skills' as a rather vague term and suggests we should think more about skills that focus on the process rather than the techniques. She suggests that the internal qualities of perseverance, motivation, perception and confidence could prove to be important for success, and I return to these affective aspects later in this chapter.

Coats was instrumental in developing resources for students and tutors that concentrate on the skills needed to 'learn how to learn' and believes that this is a key skill for students to develop and demonstrate. She additionally led the introduction of learning outcomes into OU courses, in order to clarify and make explicit the skills that were being developed in each course.

> "In many lists of learning outcomes, 'learning how to learn' or some variant of it is listed as a 'key skill' that should be encouraged and developed in all students and in all graduates. Indeed, this is much

> more than a skill - it relates to and engages with the process of meta-cognition. Encouraging students to become aware of how they learn enables them to make changes in their learning styles and strategies; to look for more effective ways of learning" (Coats, 2002 p.9).

Tutors are always key to the student support process. Lentell (2003) reviewed and discussed the role of tutors in distance education and how they aid their students' learning within the distance-learning model, and in particular the importance of the personal relationship that tutors have with each student. Jones et al. described a study that used introductory video from the tutor to create a "teaching presence" on web-based courses, to help begin a student-tutor relationship (Jones et al., 2008 p.1). Jones et al. argued that tutor input was linked directly to student learning and that the video could encourage future contact and explain online work while showing the personality of the tutor. The study showed that the video had a direct impact on progress: "The participants report that they felt as if the introductory video gave them a sense of 'being in class', and provided them a familiar feeling of 'communicating face-to-face'" (ibid p.8). These results are supported by findings from the tutors and mobile learning study described in Chapter 5, and I believe that this potential to encourage student engagement with the learning community and to create a personal link is something that mobile technologies can enhance, for example by being able to make informal contact through texts or by hearing the enthusiasm in a tutor's voice.

Issues of retention

The aim of student support is surely to ensure that students are successful. The research of Kuh et al. (2007) looked at the 'risk' factors that affect student success and found that in fact most of these are personal to the student and outside the institution's control. They then listed the following points that can be included in a definition of student success: "academic achievement; engagement in educationally purposeful activities; satisfaction; acquisition of desired knowledge, skills, and competencies; persistence; and attainment of educational objectives" (Kuh et al., 2007 p.10). In her cast study research with Indian students, Pandit (2004) also found similar barriers to self-study, and she separates these barriers into personal, study-related, time-related and institutional or administrative.

All universities and distance institutions have a large number of students withdrawing from their courses, which has been the case for many years: not only do adult learners have complex lives, but distance education in particular does not suit everyone. A 2002 study by Simpson (2003) covering a large cohort of 17058 distance students beginning nine-month courses noted the results shown in Table 3.

Table 3: Percentage of OU student withdrawal: data in Simpson, 2003 p.2

withdrawal before course start	withdrawal during course	passive withdrawal before exam / ECA	total who did not complete course
10%	18%	14%	42%

The rate of passive withdrawal was higher (20%) for new students, and about 88% of all passive withdrawers never contacted the institution for advice. It is important to note that these students did not withdraw because of failure within the course, and Simpson suggests "it is likely that many students fail to complete their course through an inadequate perception of their chance of passing and a reluctance to seek the very advice and reassurance that could support their success" (Simpson, 2003 p.10). He recommended that students should be offered clearer information about their options and available support, which the OU now offers on the web. Mobile messaging could provide an alternative means of disseminating such advice and guidance.

Mobile technologies support communication between students and can be used to facilitate self-help study groups, to offer a means of peer support and a place for discussion and clarification that can encourage students to continue. Bertram (2003) found in a small-scale study of informal self-supporting study groups in KwaZulu-Natal that such support was useful because students not only helped each other improve their academic skills but also offered non-academic support with "positive benefits at an affective level" (Bertram, 2003 p.24), which could make a real difference to a student's survival through a course. Group cohesion seems to lower feelings of isolation and could lessen withdrawal.

Perraton (2000) investigated open and distance education in developing countries and described funding as a vital HE issue, stating that ways need to be found to control costs, which depend on course development, media and student support. Larger numbers can mean lower costs per student because

course development costs can be spread, while increased costs for student support through the use of additional media may be balanced by the benefits of increased completion rates with a consequent reduction in "costs per graduate" (Perraton, 2000 p.138).

Following an analysis of student withdrawal, evaluation carried out following proactive contact with new OU students between October 2004-October 2005 showed that retention was increased by about 5%. The cost benefit of £1 spent became £5 when including income and grants for students who graduate (Simpson, 2006 p.1). He found that the importance was in the contact at certain key points of the course rather than in the content of the discussion, with some evidence that an emphasis on motivation was beneficial. Simpson (2000, p.150) believes that "... the single most important device for retention within the institution's direct control is timely proactive intervention as close to the student as possible" and suggests that it should be as 'personal' as possible, for example by using face-to-face, telephone or email options rather than a letter. Certainly mobile media could now provide a personal experience and tone. Kuh et al. (2007) similarly believe that early proactive intervention can improve the educational achievements of many students, and Pandit (2004) investigated and outlined the particular importance of student support services for the isolated distance learner in India. Critical points for a student are at the beginning of the course, around the first assignment, mid-way through a course, and before and after an exam. Of interest during my investigation was whether m-learning offers effective alternatives to these types of personal contact, and how it might be personalised to a student's needs. The aim should be to customise the support within the context of the

course or qualification in order to make the most sense to the student, as Phillips explains (2003 p.180): "In this way we will be able to provide a Learner Service which both fulfils all the generic functions and is tailored towards the personal needs of each student".

Atkins (2007) describes similar work to explore the impact of additional contact that was undertaken by tutors on two distance courses. Tutors attempted to phone each student and followed this up with an email or letter if phone contact was not made. On one course, better results followed a phone call, but for the other course, better results were made with email. Echoing Simpson's findings, Atkins found quantifiable evidence that students who were contacted mid-course were more likely to complete and pass their module and register for another, even if no contact was made and only a message was left, while those contacted mid-course were more likely to complete and pass. It seems clear that the perceptions that students have about their own learning state will affect their motivation, effort and progress. Simpson and Atkins have shown that proactive support results in an improved rate of retention for students who are contacted by phone to discuss their situation at the start of a course, and it would be worth investigating whether mobile contact or other 'opt in' communication options could enhance students' perceptions and make a similar difference in perseverance and attainment for some students. Taylor et al. (1981) undertook a study asking OU students how they came to study social sciences, and discuss the ways that the vocational, academic, personal or social reasons and motivation that lead students to study can be complex and change over time, and also affect their study choices and independence level (Taylor et al., 1981).

Student support using technology

My position in this research is that the key consideration is the effects upon learners (rather than the technologies), as emphasised by Phillips (2003 pp.168-169):

> "The basic principles that underpin the provision of a service to support open and distance learners remain the same whatever learning technology is employed, because these principles are driven by the needs of the students who use the service".

She wonders whether new technologies offer better ways of providing these services and suggests that students will use the service if their individual needs are met, using a variety of media, working both proactively and reactively as students require.

Academic services may be offered through faculty and tutors and through non-academic advisers through a student support service. The student should not, however, have to work through an institution's self-imposed structural divisions, but should be able to access an holistic support system that works for each as an individual. In the OU, in addition to online generic information, some resources use a combination of generic and faculty-specific information for some student support areas. This provides students with a link between their course and the skills development they might need, but it has proved to be a complex system to build, mostly due to a lack of suitable technology. The VLE system now enables such integration in a simpler and more achievable way, although it has its own technical limitations.

Goel and Goel (2001) argue that the implementation of any technology must be subject to certain constraints: it must be available and accessible to students, accepted by all those who will use it, and the outcomes of its use must be worth the initial investment. They describe how sometimes technologies are purchased without either considering their sustainability or planning sufficient support and maintenance staff: "we should adopt that technology which is feasible, practical, cost effective, and meets the needs of the students. ... A decision on new technology should be taken very carefully" (Goel and Goel, 2001 p.256). Additionally, Aylward (2003) describes how the implementation of new technology at OU Hong Kong (OUHK) must lead to a change in an institution's culture so that technologies become successfully incorporated: "As one of my colleagues memorably put it, 'we have new technology but the same old system'" (Aylward, 2003 p.8). She addressed the fact that students will always save time if possible, and that unless technology is designed into a course it will be considered as optional and thus ignored. Student survey results showed that "two of the reasons given for *not* contributing to the discussion boards were that participation was not compulsory and it does not count towards assessment" (Aylward, 2003 p.8). As she points out, the degree of integration of any medium or technology within a course assessment plan has always been an important motivational factor.

As with previous technological developments, some students may have access to new technologies while others do not, which causes difficulties for educational institutions. Although discussing different technologies, Tait (2003) notes the challenges of balancing the provision of new services between these different groups when

> "... many learners are ahead of their institutions in demanding ICT supported services, while in other cases institutions are having to maintain multi-channel systems of communication with all the concomitant costs, because some cohorts of students cannot keep up with the hardware demands and line charges" (Tait, 2003 p.2).

Distance education institutions are constantly in this position 'between' technologies: offering new varieties of media while older versions are retained because they still suit some students. The additional costs in time and resource will force some difficult choices about discontinuing older technologies.

Whenever new technologies become available there is always the question of degree: to what extent are these new media different to the ones that came before? Goel and Goel (2001) state that interactive media differ particularly because of their capability for group interaction:

> "With the explosion of technology, distance education is increasingly being defined not by the technology used for delivery but by the nature of interaction involved in the educational process" (Goel and Goel, 2001 p.99).

Handheld technologies have added additional options to those available in 2001 when this quote was written. They allow students to learn in private, which Collins et al. see as an important option through their exploration and application of fundamental principles of learning in collaboration with other educationalists: "people avoid the loss of face at all costs - rather than being

educational 'losers' they will simply not enter the race" (Collins et al., 2002 p.170). When student support is offered online for distance learners, students can access information and advice anonymously, to help them build their skills or make decisions about their learning and without having to admit to anyone that they have a problem. This is a useful opportunity for those lacking confidence, and in my experience many such students undertake distance education.

Mobile devices still allow learning in private, but add easier access to livelier aspects and social learning such as active involvement, democratic context, flexibility, allowance for individual differences, motivational environment, relevance to goals, and collaboration, that could be integrated across disciplines and support self-esteem. When computers were able to provide interactive flexible education using web, computer-mediated communication (CMC) and bulletin boards, Pandit identified this as the fourth generation of open and distance learning (Pandit, 2004 p.16). Whether m-learning is sufficiently different to become the fifth generation has yet to be identified.

Affective aspects of student learning

Student autonomy is an explicit goal expressed by many authors in current UK higher education who cover the encouragement of independent learning: not in the sense of being isolated or alone, but in having the ability to discover information, develop ideas, solve problems and evaluate their learning without relying on input from others. For example, Candy says HEIs should encourage their students to become "continuing self-directed learners"

(Candy, 1988 p.59).

Boud (1988) describes three aspects of such autonomy. Firstly, this is an educational goal, resulting in students who can make their own decisions about what they do and what they think. Secondly, it is an approach to practice that encourages student responsibility and leads to individuals who are effective learners and employees because they can find and use resources and have learned how to make decisions and solve problems. Thirdly, it is a necessary part of any learning process. Boud explains that learners develop over time through various stages of learning as they become less dependent on content or teachers and gradually more self confident, until finally they are able to integrate their own and others' perspectives (Boud, 1988 p.29-30). Movement between all of these stages can be facilitated or constrained by the teaching, and the tutor's attitude is key:

> "It is not any technique or teaching methodology which is primarily needed, but an attitude of acceptance and appreciation of the views, desires and frames of reference of learners. Perhaps the single central quality which fosters autonomy is the quality of the relationship between teachers and learners which develops through this acceptance" (Boud, 1988 p.39).

Another aspect of student autonomy relates to growing understanding and expertise. Candy (1988) points out that someone who gains expertise in one field and becomes an autonomous learner there can, in another subject area, be a novice and dependent learner: student autonomy is therefore situational and epistemological, i.e. content-specific, and a student cannot become a

self-directed learner once and expect to be so in all subjects. Interestingly, Candy describes how course developers creating learning packages themselves gained a great deal of learning because they had to evaluate and choose material, design and present their knowledge, categorise then describe it to others, but the students who received the material did not achieve that degree of learning (Candy, 1988). This illustrates that student input in choice and design of their learning activities can improve their depth of learning and understanding of the subject: the pedagogical reason for the support of learner autonomy is that students learn more effectively when they have some part in decisions about their study. Handheld technologies may allow students a greater choice and thus more effective learning.

Learning with and from other members of a group is educationally important but not necessarily easy to incorporate into distance education where the opportunities for discussion and further understanding can be limited. The ability to work with others in a state of interdependence is the most advanced of Boud's stages of learning already mentioned above, where students can accept the validity of other people's feelings and input, and link these with their own. Mobile technologies allow social exchange and networking for distance students in ways that have not previously been possible within online forums. Knapper (1988) discusses the criteria that help students learn how to learn and considers how well the educational technology available at that time fit those criteria. I believe that current handheld technologies have the potential to support Knapper's criteria across the board: allowing active involvement, democratic context, flexibility, allowance for individual differences, motivational environment, relevance to goals, collaboration,

integrated across disciplines and supporting self-esteem.

Knapper made some telling predictions in 1988 when he stated that

> ".. the possibility exists that information technology will - unwittingly - help promote the goals of lifelong education by passing responsibility for learning from 'experts' (teachers, textbook writers, courseware designers) to students themselves. If this happens, it would be especially important, for the likely dominance of technology in the world of the future makes it essential that control is not left to the 'authorities' but broadly shared among the population" (Knapper, 1988 p.106).

In current society we appear to have reached the position that Knapper predicted, where knowledge is increasingly shared online through collaboration between many people rather than dissemination by a few experts in the more traditional way. He was right that it would be information technology that enabled this to happen, but I am sure that in 1988 he could not have imagined either the speed at which this change has occurred nor the possibilities that wireless-enabled technologies already allow. Knapper also writes that a feature of the computer-based education that was being developed was that its design was often based on earlier instructional models. This can be an unfortunate choice and may not make the best use of the particular medium, so it is important that the learning models that have since been developed for electronic communication or web-based learning are not simply transferred directly to handheld technology, but that the particular advantages of mobiles are promoted. New instructional

models will need to be developed to make the most of handheld technologies.

A student's approach to learning is not fixed, but affects how that individual will work on a learning task, dependent on the situation and the content. Boud explains that "The same students act differently when confronted with different kinds of task; the same task is treated differently by different students" (Boud, 1988 p.34). While a deep approach is not always an autonomous one, a surface approach does not show autonomy. A third approach, less commonly described in the literature but mentioned by Boud (ibid p.33) is an achieving approach, where the student pragmatically uses a deep or surface approach to best fit the requirements of the work or assessment to fit the time available. This seems to me to be a stage achieved by quite experienced, or certainly confident, learners who can decide where to focus their efforts for the greatest value. Entwistle et al. were working to develop their work on approaches to learning through an analysis of student inventories in 1979, but there has since been some confusion and alteration in the meaning of the terms they used. Their original discussion focussed on students who could use appropriate strategies to suit a context, relating to their "intention, process and outcome" (Entwistle et al., 1979 p.367). Over time, as Marshall and Case tried to clarify (2005) when they joined the ongoing debate on the subject, there has been "an inevitable degree of conceptual slippage" about the phrase 'approaches to learning' so that sometimes people talk about 'deep learning' with the inaccurate implication that there are stages that learners pass through (Marshall and Case, 2005 p.258-9), although a 'deep approach' actually describes the type of critical thinking that is implicit within higher education.

A different aspect of student development that can affect motivation and expectations based on a student's past experience is Mezirow's Transformation Theory that builds on earlier work by authors such as Bruner and Habermas and explains that adults have frames of reference that result from the ways they have interpreted prior experiences, incorporating cultural or social and personal perspectives that filter incoming perceptions, feelings and experiences. For Mezirow, learning means that we either learn new frames of reference or transform our points of view or habits of mind (Mezirow, 2000). Subsequently Kegan (2000) argues that Mezirow's theory is not confined to adult learners: epistemology is about a way of knowing, rather than about what is known. Kegan notes that when Mezirow looks for an epistemological shift, what he expects is that a student should become self-directed rather than internalising social frames of reference. Kegan's point illustrates an aspect of learning theory development - that it reflects the current cultural climate. Mezirow's view fits the culture of modernism in the west, while traditionalism would fit better with stronger community and social structures. Other cultures have different ideas about a student's place in the social world, such as an unequal balance of power between teacher and learner in higher education in some cultures. Additionally, self-direction may be the aim of British educational culture, but a student may not be personally ready to become self-directing and need support to do so. Taking on new frames of reference can involve a complete change in a student's way of seeing themselves and their world and can be difficult to undertake.

I now consider student motivation, a complex area that incorporates theories of needs, goals, the social setting, and intrinsic and extrinsic motivation.

Brophy (2004) reviewed the extensive literature on motivation and describes how the majority of knowledge learned about motivation fits the "expectancy x value" motivation model that explains how people will make more effort on tasks where they expect to be successful and thus will gain some sort of reward, the value of which (to them) affects their degree of effort. Firstly, for motivational strategies to be enabled, Brophy argues that some preconditions must be in place, including the importance of providing an attractive learning environment:

> "make yourself and your classroom attractive to students: focus their attention on individual and collaborative learning goals and help them to achieve these goals; and teach things that are worth learning, in ways that help students to appreciate their value" (Brophy, 2004 p.50).

Brophy's writing describes classroom teaching, but can be translated into an electronic context. He argues that students will be motivated if they receive information about what they can learn and how it will help their own long-term goals, explicitly clarifying the value of topics. Student motivation to learn is aided if they understand the strategies that help their learning, and when people believe they can control outcomes they increase their effort and persistence and their approach to learning becomes deeper. Collins et al. (2002) list similar criteria to promote good learning: it should be active and interactive, transformative and intrinsically motivating, and can be encouraged by good relationships and effective communication. Few students would want to take part in learning when they could not understand its importance or how it would help them, or if the tutor and study environment

held no appeal. Clark (2006) reminds us that a student is

> "an active participant at the centre of the process with interests, intrinsic motivation, personal constructions of meaning and the need for self-regulation. It is the learner's willingness to learn that matters"

because this affects their behaviour (Clark, 2006 pp.5-6). Students should be encouraged to feel that they can and will learn.

Other research has considered the link between m-learning and students' attitudes. For example, Sheehy et al. (2005), in a review of literature and projects, described how tablet PCs were used as a motivational tool in schools, and pupils became willing to re-visit tasks they had found difficult because the tools engaged their interest (Sheehy et al., 2005). A JISC report on innovative e-learning practice, based on reports on a number of projects across the country within an Innovation strand, found that multimedia mobile learning activities "had the additional benefit of improving self-esteem and bringing isolated groups of learners into contact with the wider community" (Joint Information Systems Committee, 2005 p.18) while creating supportive communities of practice for isolated learners and strengthening learner involvement with 'just-in-time' information.

Conole et al. (2006) undertook a comprehensive in-depth case study of the perceptions underlying student use of technologies using an online survey, audio logs and interviews across the UK, with a key finding that students greatly value the technologies they have chosen themselves. Students also use the 'social affordances' possible to communicate with other students and

enlist their support:

> "the picture emerges very much of a networked, extended communities of learners using a range of communicative tools (email, msn, phone, discussion forums, wikis, blogs, Skype, etc) to bounce ideas off each other, to query issues, to provide support, to check progress. This peer network is particularly valuable to students who favour a social approach to learning but it's almost universally important to some extent" (Conole et al., 2006 p.94).

Conole supports the concept of digital natives and mentions eight important factors that relate to them: pervasive technology use; niche, adaptive, utilitarian use across communities; personalising to suit their needs; information management; transfer of technological skills; more fragmented learning; tool use changing the patterns of work; integration of tools to provide flexibility as they are needed. Phillips et al. (2004) additionally argue that "Students use a variety of media and have their own preferences; they like to be recognized and treated as individuals. Recognizing this individuality within a learner service can be an influential factor in student learning" (Phillips et al., 2004 p.200).

Wireless communication has diffused at different rates globally. Castells et al. (2007) offer a global view in their analysis of reports, statistics and government information, and describe how developing countries use mobile phones because they are more economic than landlines and landline infrastructure is often poor, as well as for other geographic, industry and sociocultural factors. Additionally, text messaging may demand new skills but

it adds value to the phone and allows wider communication, and can be "adopted, adapted, and modified by people to fit their own practices, according to their needs, values, interests, and desires" (Castells et al., 2007 p.125). This shows how people can shape the technology they use, rather than being restrained by it. A key finding of a 2007 JISC report, carried out into student perceptions using a scoping study, literature review, methodology report and studies with learners, (including five video case studies using learners accounts), found that control and choice were of great importance: students reported that their choices supported their growing sense of identity, allowed them to contact peers, and offered personalised and just-in-time learning, with an overall result of an "increased sense of ownership over the process of learning" (Joint Information Systems Committee, 2007 insert p.9). The report also noted potential drawbacks: that students expect educational institutions to respond to them as quickly and effectively as other customer services they use, and that technologies allow an "underworld of communication" through texting, instant chat or non-institutional online social spaces (ibid p. 21).

Users will adopt a technology that offers them advantages, whether these are practical or alternatively social, like peer approval. Simply offering learning support is not enough: students may theoretically be empowered to make informed choices, but new learners will need help to develop their learning. We have seen how the tools become highly personal, and that users can become quite dependent on their use. Jones and Isroff applied two theoretical approaches to their own small case study and offer six reasons why informal learning through mobiles can be motivating: "control (over learners'

goals), ownership, learning-in-context, continuity between contexts, fun and communication" (Jones and Isroff, 2007 p.248). Again, we return to the student wanting to be in control of their learning in a way that was neither offered nor possible in earlier times, when teachers and institutions set the curriculum and students were expected to 'absorb' the learning. This change in expectations of learning echoes changes throughout society.

Many authors discuss the importance of affective aspects and skills that could influence study and enhance a student's progress. Mumford, known separately for his work on learning styles, states that learning "is primarily driven by the individual's motivation, needs and interests" (Mumford, 1999 pp.66-67) and identified the following skills as useful for learning: "questioning, listening, reviewing, sharing, observing, relating a to b (conceptualising), accepting help, monitoring" (Mumford, 1999 pp.24-25). Race (2003), in his foreword to Talbot's practical guide for students, notes that successful distance students not only develop their subject matter knowledge but also move towards becoming independent learners who could transfer their self-management skills into other contexts. Talbot (2003) promotes self-motivation to students, together with traditional study-related skills such as critical reading, note taking, information literacy, communication skills and IT, and with other skills that are less explicitly addressed in HE support:

> "self-confidence, perseverance/resilience, determination, self-discipline, time management skills, forward planning, ... ability to take responsibility for your learning, a balanced learning style, ... the ability

to ask for help from the most appropriate source" (Talbot, 2003 pp.9-10).

Using handheld technologies for student support

There is a mass of material relating to educational uses for m-learning, most relating to coursework. While there is a general lack of literature addressing mobiles for in student support, Kukulska-Hulme and Traxler explain the benefits of mobile timeliness and contact for academic skills, career and administrative information such as timetables or regulations (Kukulska-Hulme and Traxler, 2005). Additionally, de Freitas and Levene (2003) discuss short chunks of learning material that can suit skills development needs: for example, rather than providing comprehensive resources to cover 'everything you need to know about notes' a student might only need material on 'how to mind-map'. Valentine's 2004 desk-top research into m-learning developments recorded improvements in a variety of skills including in critical thinking, reading comprehension and writing, learning, motivation and self-confidence. Ferris and Wilder (2006) gathered information and examples about the use of wikis in education and found that wikis offered opportunities for collaborative working and writing which suited digital natives and the way they think, while encouraging "participation and a strong sense of common purpose" (Ferris and Wilder, 2006).

Fox (2001) used a literature review, focus groups and a national survey together with data from sociocultural monitoring of trends, and discusses people's natural inclination to chat and gossip and how it benefits social and

psychological functions, so technology-aided means of gossip will be naturally motivating. As well as encouraging communication through discussion with peers or experts, m-learning provides new ways of collecting, using and sharing media and can provide activities to support study skills development. It also provides opportunities for students to actively participate and engage with the learning material, hence encouraging their higher-order thinking (Bloom, 1956). Riordan and Traxler (2005) explain how the University of Wolverhampton's Centre of Excellence (CETL) for using innovative technologies is investigating the role of m-learning with students in a region of social and economic disadvantage, using targeted bulk SMS texting to enhance student support, inclusion and retention.

Issues in student support through handheld technologies

Paul (2000) reviews trends in the use and development of technology in HE and warns educational institutions that once new techniques for effective education have been identified and used, old methods may become inadequate, and that "A change in technology will usually be associated with a change in the institutional culture, whether planned or unintended". He argues that "student demands, more than any other force, will transform our universities" and feels that the ubiquitous use of mobile devices may become a driver for change (Paul, 2000 pp.43-44).

The future of student support in the ongoing financial climate will necessitate a reduction in institutional costs. Support services will have to be limited, allow economies of scale, or perhaps be chosen and paid for by the student as

an additional option: it must be paid for somehow. Alternatively, effective student support may be important enough to students that they will choose to study at institutions that make a strong commitment to them. As Mills (2003) argues, whether it is offered to everyone or only to those who need it, built differently into programmes or paid for when used, in any large educational institution it will be complex to allow flexibility. Mills, like Simpson, believes that support provided by the institution is a critical component of its success in the educational field.

Kuh et al. (2007) consider how distance institutions should find ways to make students feel a collective purpose in their involvement in the learning community, because such engagement is related to improvements in student achievement and can benefit students:

> "Students who are exposed to one form of effective educational practice, such as active and collaborative learning, are also more likely to report higher levels of participating in other desirable activities, such as challenging academic work, diversity experiences, contact with faculty, and so forth. Equally important, they are more likely to get higher grades, report being more satisfied, and are more likely to persist and graduate" (Kuh et al., 2007 p.284).

The potential problem of providing effective student services within a large distance education institution is the numbers involved, but mass numbers can in fact become an advantage through the centralisation of distance education in contrast with campus-based institutions because per-student costs can be lower. This issue emerged during the interviews reported in Chapter 5.

Key points from review of the literature: student support

This second chapter of the literature review has partly addressed research questions 2 and 3 by considering the options for student support and how they could be enabled through mobile learning technologies.

2. What are the main drivers and barriers that encourage or dissuade students from making use of mobile learning technologies, and how might these influence the nature of the student support offered by higher education institutions?
3. If the use of mobile learning technologies enhances the student learning experience within a distance education context, in what ways could HEIs make use of these mobile learning technologies for student support?

I discussed in Chapter 1 the importance of student support and student services within distance education, and this chapter has shown a variety of different types of support that can be provided to help students achieve their learning goals. Evidence from the literature shows that mobiles enable learning, and could be used in a variety of ways for student support, such as for the development and review of skills or by the provision of advice, guidance and information, for example for student induction purposes. The use of mobile technologies can encourage students to feel part of the educational community, and may thus enhance the affective aspects such as motivation and a positive attitude to their learning. A student's sense of control of their learning can be improved through the availability of a variety of media and by allowing students to choose what they receive.

Learning resources must use media that are suitable both for pedagogic reasons and for the students who will use them. M-learning may not suit all students or styles of learning, but offering this alternative could suit the different ways in which distance students work (although the resources needed to make these provisions will always be limited). If support materials remain available in print and online, adding an m-learning option should not disadvantage students who do not use mobile devices (this might need confirmation through research because of the 'added value' that mobiles can provide). Wider aspects of student support through communication with advisers, tutors, faculty members and administrative services can make use of mobile devices in various ways, and will be addressed further in Chapter 6.

Staff development may again be an issue, as identified in the previous chapter. It has been noted that m-learning can allow distance education institutions to use their centralised service provision to disseminate materials and communication to their students, whether to individuals or to mass numbers, while allowing personalised material to suit the students' context and needs.

Again the literature illustrated the application of various different methods that I might use for my own research. As I mentioned at the end of Chapter 2, my research plan included the use of several different research methods as a means of helping to ensure the validity of the research. Having investigated a number of different methods that authors described in their literature, as covered in Chapters 2 and 3, as well as considering a range of methods that are covered in the theoretical literature elsewhere, for example by Bryman

(2004), Huberman and Miles (2002), Silverman (2005) and Wolcott (1990), I decided on the different methods that I would use and planned my research. Simpson (2003) and Atkins (2007) had done work on proactive support to students, and Pandit (2003) had discovered how important study support was to distance learners. These suggested ways of structuring my research into the provision of student support, which I developed into the tutors and mobile learning study described in detail in Chapter 5. Additionally, authors including Conole (2006), Margaryan and Littlejohn (2008) and TESEP (2006) had used interviews to gather information and I used this method to pursue more specific information from study support experts, as described fully in Chapter 5.

I next address in Chapter 4 the methodologies considered and chosen in order to develop my research.

Chapter 4: Methodology

In developing a research study many different choices are made about the way it will be approached, the people who will take part and the methods to be used. As the research continues over time, further decisions are made. Research is an ongoing process that is unpredictable at all stages, from the formulation of the problem, selection of case and method, data production and analysis and to writing the findings. Early in the research my readings in the theoretical literature informed my thoughts and in this chapter I cover the decisions I made in choosing a research approach and research methods (which were influenced by readings of the literature, as shown in Chapters 2 and 3), as well as aspects of quantitative and qualitative research, ethics, validity and reliability, and how these relate to the particular studies that have been undertaken. Details of the studies themselves are covered in Chapter 5.

Methodological approach and rationale

My research falls within the enlightenment model, described as

> "supplying resources that may be of use to policymakers and practitioners: descriptive information about the situations they face, and theoretical concepts which provide an understanding of those situations and the roles of policymakers and practitioners within them" (The Open University, 1999 p.27).

Within that model, it primarily analysed how some people use mobile technologies and then considered whether these technologies would suit student support in distance education.

I like to work with others towards a practical goal, based and building on my own experience and extending my own understanding, and I spend a great deal of time reflecting on my ideas and practice. Because of this combination I was attracted to an action research (AR) approach, with the research aiming towards a useful and practical application of knowledge within distance education that might benefit students, staff and institutions. Many examples of this type of research are covered by Reason and Burgess (2001) and illustrate the range of approaches, practices and perspectives that AR can incorporate. Basically the research is "participative, grounded in experience, and action-oriented" (Reason and Burgess, 2001 p.xxiv) and can be based on various assumptions. Figure 2 (p.93) indicates the research process I planned to undertake: I would identify the initial question, find out more about the issue, decide what to do and take some action, evaluate the results and then continue amending my practice. This ongoing process of my own development as a researcher took place throughout this research, that is, alongside data collection and analysis of findings. Later in this chapter and in Chapters 5 and 7 I show additions to and adaptations of this figure that identify the specific methods used during different parts of my research - the initial questionnaire, tutors and mobile learning study, and interviews with study experts. The figures also illustrate how each of the individual components of my research linked to one another and fed into the research process and affected my personal thinking and practice.

Additionally I designed the main research study as participative action research, in which a number of tutors planned and developed their work to suit and to benefit their student groups on particular courses and to improve their own performance. As the tutors planned, developed and produced mobile accessible communications materials, resources and media to deal with the issues that they had identified and wanted to address, they received feedback from their students and could adapt their plans accordingly. They also had access to a forum where they could share their thoughts, concerns and ideas about their work with each other.

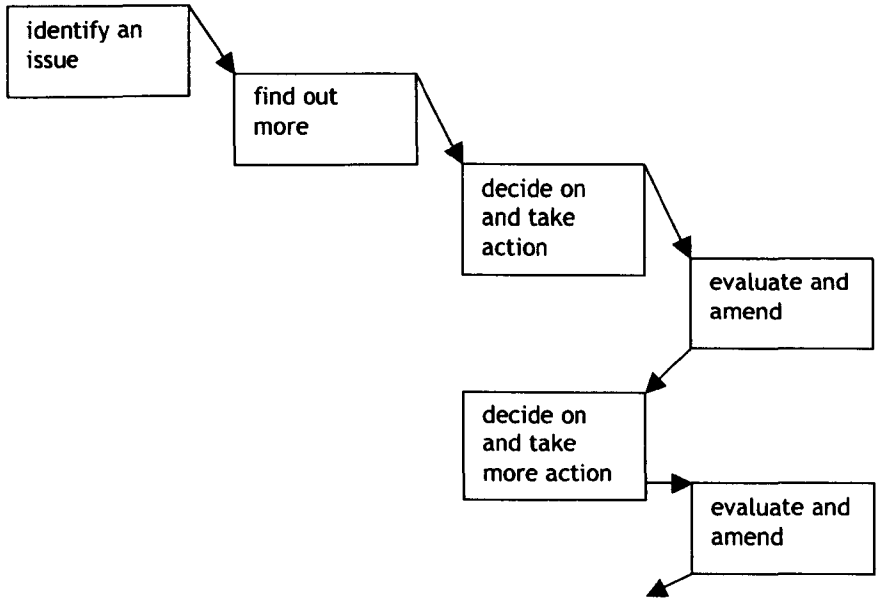


Figure 2: The research process

Gibbs (2007) notes that explanations can be nomothetic, covering what situations have in common, or idiographic, in terms of their unique factors. I feel that from the research the information that has emerged has been nomothetic in terms of being applicable to other distance education

situations, and also to some extent in connection with campus-based education.

When I was considering how this research would be gathered and written up, I found the vignettes used in Anderson et al. (2001) to be an interesting way to illustrate research information, using commentary to explain necessary points. I have used brief vignettes in Chapter 6 to describe ways in which a combination of approaches within an institution can together form a supportive environment for students using mobile technologies.

I considered the use of narrative as a way of reporting results and bringing together the different aspects of the research. Narrative can deal with complex human endeavour by including a description of the motivations and perceptions of those involved, as well as of influences from culture and the subjectivity of a person's worldview, and "has the capability of crossing the boundaries between research and practice" (Webster and Mertova, 2007 p.10). It fits within postmodernist philosophy as a way to deal with the complexity of learning with new technological systems and electronic information and in which "each person brings their own 'baggage', or past life experiences, to a situation" (ibid pp.28-29). Kvale (2007) explains how the analysis in this method aims to find what themes underlie the information, similar to many other research methods, but as a social construction of knowledge. It is also clear that both context and the time at which something occurs are key, with critical events being an important part of the story that help to give an overview of the context, key participants and main events. However, I was uneasy with Clough's (2002) description of his use of fictional narrative, where

he composes stories that pull together aspects of events, people and perceptions in a way that offers participants anonymity while illustrating the type of evidence that was investigated and the data he analysed, and I felt that if a reader does not know whether or not something actually happened (for example Lolly, p.8) this could be potentially misleading as a way to write up information. As a consequence I have avoided a fictional approach.

Figure 3 below shows how the various parts of my research fed into my thinking about the subject, and necessarily led to adaptations of the work that I was doing and new ideas for the literature that I wanted to read. At the same time this input needs to be considered within the research process shown previously in Figure 2.

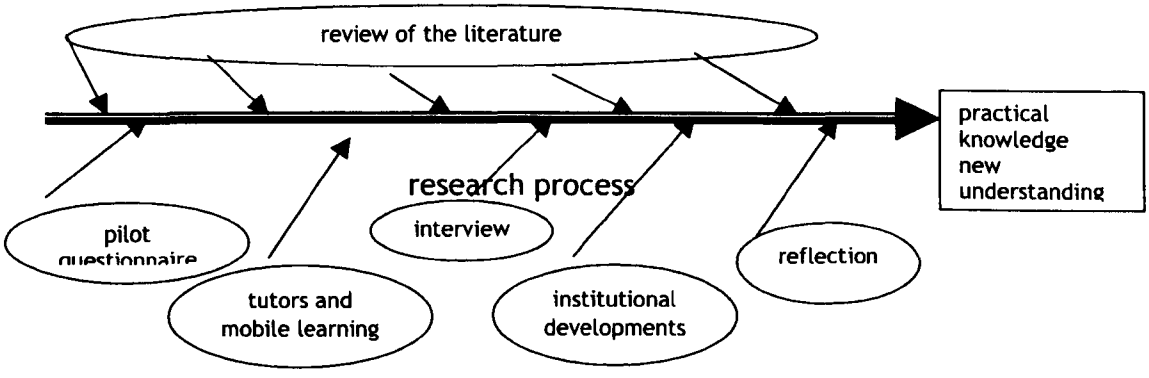


Figure 3: Research methodology influence on the research process

Quantitative and qualitative research

Although quantitative and qualitative research are often described as though they were opposites, Ercikan and Roth (2006) consider them as linked on a continuum, and indeed it is clear to see that many aspects of research have

both qualitative and quantitative aspects, for example in noting types and frequency of observed interactions or making judgements about categories of quantitative research. Ercikan and Roth also argue that the consideration of types of research as either quantitative / objective or qualitative / subjective tends to focus on the collection methods rather than on the more important need to develop effective research questions and conduct useful research. They also address the generalisability of both quantitative and qualitative research, as qualitative research generally aims to richly describe particular experiences and situations and may categorise them by grounded theory without considering generalisability: but because phenomenological work considers the wider population, and thus makes more general inferences, individual pieces of research can be considered not only for their own detail but also as a way of understanding the general. Hammersley and Gomm (1998) similarly note that the benefit of a diversity of ideas in research results from a variety of studies that are focused on and affected by particular purposes. Perhaps it is more useful to concentrate on the methods that would suit those purposes rather than become too involved with the categorisation of the study as either quantitative or qualitative.

My main research used qualitative methods, looking at the situation and attempting to discover the way that different participants understood it; using descriptions of the processes and social relationships involved; and attempting by inductive analysis to develop theory that was grounded in the topic that was described.

In research as well as in general terms Phillips (1993) argues that 'objective' has become a positive term while 'subjective' is considered to be negative. Although quantitative methods are often stated as entirely objective, we know that researchers make many judgements in the design and methods. For example, if someone chooses to count the number of responses made by pupils to a teacher, they decide which teacher and which pupils and also what constitutes a response: speech, gesture, sound. Will those responses be separately noted, or judged as equal? These may be perfectly reasonable decisions, but are unlikely to be totally objective judgements. Eisner (1993) argues that the results of our research are based partly on the framework developed around our knowledge, experience, understanding, culture and biography and he rejects the urge towards objectivity in the sense of seeing the world in a factual way.

Phillips (1993), however, questions Eisner's view. If methods, reasons, evidence and conclusions have been critically examined and scrutinised then the work may have value.

> "'Objectivity' is the label ... that is used for inquiries that are at one end of the continuum; they are inquiries that are prized because of the great care and responsiveness to criticism with which they have been carried out. Inquiries at the other end of the continuum are stamped as 'subjective' in that they have not been sufficiently opened to the light of reason and criticism" (Phillips, 1993 p.71).

It seems fair to say that although true objectivity can be an elusive aspect, researchers take a great deal of care to consider their own expectations and to broaden their view as much as possible when analysing the data and summarising their results. I found the descriptions of educational research in Walford (1991) to be useful in illustrating some of the potential complications and problems in the reality of the research process.

Qualitative research can offer detailed descriptions of the situation, processes involved and the various participants' feelings about it. Ball (1993) points out how people behave differently in different situations, at different places and times and with different people around them. Research allows us to gain insights, although from a single study it might only be possible to provide ideas for development and further research rather than generalisability across wider use. Using triangulation to check content, considering external forces, understanding the need to remain objective and not become too involved in the participants' perceptions, and keeping in mind the researcher's own experience and possible biases, all help to ensure that the research is useful and provides good insight, and keeps towards the careful and objective end of Phillips' continuum.

Qualitative research has some limitations: it can indeed be subjective, and there can be issues of the costs of someone's time, or the risks of privacy or ethics. In this case the time was my own, and privacy and ethics are carefully controlled in OU research through the Student Research Panel (and ethics is further considered later in this chapter) and I remained aware of the danger of subjectivity. The benefits of qualitative research are the greater

understanding that it can offer in investigating the perceptions of people involved in the situation, which in this case was concerned with whether mobile support is an option worth pursuing. Because this research was based within a particular bounded context (in this case a large, UK, tertiary distance education institution), it describes some unique aspects. Nonetheless, I can see no reason why these options for support might not be applied in other learning institutions as a means of encouraging, informing and advising students undertaking distance- and campus-based learning.

Shavelson and Towne (2003 p.2) noted that

> "It's the question - not the method - that should drive the design of education research or any other scientific research. That is, investigators ought to design a study to answer the question that they think is the important question, not fit the question to a convenient or popular design".

They suggest that research questions are of three types: to discover a description of what is going on; whether that results in a causal effect; what mechanism causes the effect. They also state that it is the research question that leads the research design, and that ideally all three types of question would be covered in a research design that uses several methods (Shavelson and Towne, 2003).

Within my research there were some quantitative questions to students as they chose from a list of options within the pilot questionnaire. This was

designed to discover some basic information from which I could develop my research areas. Following this I mainly relied on qualitative research methods, as I was interested in the reactions and perceptions of students, tutors and student support experts, and felt that these could best be gained by using this approach.

Interviews allow a depth of response because answers can be clarified and investigated further when necessary. For this reason, I used interviews with student support experts to look into the types of support that an institution can provide to help distance students to study effectively and to find out how these might be facilitated by handheld technologies. Interviews with experts can elicit not only descriptions of practice and the sharing of knowledge and experience, but also can investigate the context of and purpose behind their work. Additionally, because distance learners and tutors are by definition 'elsewhere', I used questionnaires throughout the main tutors and mobile learning study to widen the response base.

In accordance with Shavelson and Towne's suggestions, my research has used multiple strategies to collect evidence, including questionnaires about student and tutor preferences and perceptions, analysis of tutor plans, material and reports, and interviews. The data included reports and written communications, transcripts of interviews and completed questionnaires. The background investigation used literature and document reviews and evidence from research outside and within the OU. This combination of strategies and multiple methods of data collection allowed triangulation to support the validity and reliability of the research work, which was based on an initial

hypothesis that the use of mobile techniques or devices would be of beneficial support to some students.

Research methodology

I will now describe different aspects of the research methodology in relation to the different threads of my research.

Because it is not feasible to unobtrusively observe distance student behaviour, I decided to use questionnaires as a viable alternative for finding out their preferences and their reactions to tutor-provided material. The pilot study used a set of questions, some of which were based on early ideas from the literature review. Participants in the pilot study were students, mainly young people aged up to 35 (thus including participants within the 'digital native' age range) who were questioned about their use of technologies, frequency of use, and the types of media they thought made resources effective.

The main study within my research was an example of practitioner research, carried out by tutors into their own communication methods with their students, in order to develop their own practices and to inform other tutors' work. The tutor participants had a range of experience of teaching in a variety of subjects and included those who knew nothing about the technologies they would be using, as well as some who already had some knowledge. This was to try to ensure that they could represent the normal range of tutors that teach on OU distance courses. As will be clarified in Chapter 5, I was to some extent removed from the tutors as I was not directly

involved with their students or with the uses they made of mobile technologies, but evaluated the questionnaires and reports they returned to discover both student and tutor perceptions about the value of their work. This was practical AR, as the tutors developed and evaluated their own work, and results allowed us to use successful methods and media for dissemination to other staff and students, leading to possible changes in practice outside the immediate areas of the tutors involved (Kemmis, 1993) and into the wider distance education environment. The tutors volunteered to take on the work and were in that way self-selecting: most had little or no experience of the technologies they tried. Members of the group were chosen in part to cover as many regions and faculties as possible, to allow an estimation of how well the materials could be adapted across the wide OU range. This would fit with the argument of Faulkner et al., that the main aims of research are to answer specific questions, fulfilling a planned purpose by working in a systematic and self-critical way, being informed by theory and relating the research to earlier work, and ultimately providing new information to an audience who can make use of it to enlighten their own work (Faulkner et al., 1994).

Praxis is "informed, committed action" (Kemmis, 1985 p.141) where theory and practice inform each other to help a practitioner to make good judgements about their work. The tutors made decisions about the individual areas of work that they wanted to investigate. One of the benefits of practitioner AR is that it was their own interests that led the tutors' work, and suggested areas that they saw as both useful to their own practice and as important developments within education.

Both Lacey (1976) and Nias (1991) identified the need to allow time for thought about the progress of the research to form connections and clarify ideas, and this was possible during the long-term tutors and mobile learning study. Questions by questionnaire or interview offered a viable method for obtaining understanding about perceptions: as the study guide for the OU course E835 Educational research in action (1999) suggests, asking open questions can elicit ideas that the researcher has not yet thought of (The Open University, 1999) and provided an opportunity for further consideration and follow-up questions if necessary. Earlier work I had done during the evaluation of online resources suggested that thoughtful and useful answers can be prompted through such questioning methods and could lead to further discovery. I therefore incorporated questionnaires for students and tutors into the tutors and mobile learning study, and these allowed me to find out (particularly from the students whom I never met) their reactions to the alternative materials.

Once the main study was complete I had a better understanding of some of the variety of ways that tutors worked with their students. However I then felt that I needed to know more about other aspects of student support for distance learners, so I planned one-to-one semi-structured interviews with senior student support staff to investigate other ways that support was provided and how these might or might not be facilitated through the use of mobile technologies. These interviews were fairly informal, as I wanted to gather views from these people about particular student support issues that they had encountered during their own work or that had emerged from my own research. The interviews were about an hour in length and, in line with

the advice from Burgess et al. (2006), were held in a quiet room so that we would be uninterrupted. I explained how the information would be used in my research and gained permission to record and take notes on the discussion. The information has been anonymised and the participants are identified as Interviewee A from University Y and Interviewees B and C from the OU.

Ethics

The original questionnaire to students was a simple one that did not involve any personal details or probing questions that might have caused them any anxiety or cause any threat to their self-perception or learning experience.

There are ethical considerations within AR that are subtly different from other forms, as the researcher can become more personally involved with the study and may lose their objectivity, and at the same time there must be care for students and their educational development. My separation from the main work done by the tutors in their individual studies allowed me to avoid this problem, although it was important to keep aware of the possibility of such difficulties and to keep a balance, by observing strict protocols and procedures and encouraging feedback and input from other people, including colleagues who were associated with the research.

There are ethical constraints on working with students and institutional guidance on the requirements of such a study, and I needed permission from the Student Research Project Panel (SRPP) before OU students could be approached (Appendix 3 shows completed form). Students could not be

overburdened with extra work or excessive evaluation. The use of mobile techniques or devices had to be offered as an alternative method of communication, and those students who could not or chose not to take part had to have suitable alternatives provided. Students were asked to opt in to the processes or materials of the study and to the research aspects of it. They had direct access to me as researcher to give them an alternative person to consult if they had any concerns.

Tutors developed a plan of their proposed work to ensure that they did not over-burden themselves or their students. Some issues that arose during this study are covered under the next heading.

Educational research in general is multidisciplinary, as it can have different social, psychological, political or subject-based aspects. The work depends a great deal on the researcher's relationship with other educational practitioners and colleagues while protecting informants from identification through the anonymity of contributions to discussions or in responses; privacy by avoiding personal details; impartiality by not being judgemental about opinions and ideas; ensuring that participants understand the research work, know who will read it and that they can choose whether or not to participate and whether they wish to withdraw. The researcher must also consider and deal with problems, conflicts and disagreements found in the material.

Formal approval through the OU Human Participants and Ethics Committee (HPMEC) was not sought as the type of data being collected suggests that "no harm could arise to any person, living or dead" as noted in the HPMEC terms of reference. However, I had to stay aware of any issues that could arise as to

confidentiality, privacy, impartiality and participant understanding throughout the collection and analysis of data.

Support for the tutors was available through the two workshops, by access to advice and technical help from a number of central colleagues, and through a specific tutor forum that was set up for the study, where they could share ideas, concerns and recommendations.

The senior student support staff that I approached for interviews were willing to take part when I explained my research, and gave consent for me to record and use the content of the discussions.

Tutors and mobile learning study: methodology issues

The choice of students, tutors and senior experts limits the research results to a certain extent (Ball, 1993) because there were other voices that were not heard, but I was seeking peoples' perceptions about mobile media and an extensive and ongoing literature review served to provide balance.

The ethics considerations in this study caused some complications. Following permission from the SRPP, queries arose as tutors developed their plans and outlined them to their students. For example, what would be the position if a student from another tutor group attended a tutorial? There was a need to filter the student names from all groups to ensure that any student who had previously asked not to be involved in research would not be approached: then it was found that one such student had given consent and wanted to be included. A tutor wanted to use some music that was already part of the

course, but as copyright had not been approved for this additional medium this was not possible. Another tutor queried whether she would be able to record a language tutorial (for later use) if an opted-out student would be present. Additionally, tutors had to have permission from their line manager and course team manager before they could take part, and this involved an explanation of the study for one course team before approval was given. Advice from the SRPP was invaluable to answer such questions about issues that would have been difficult to foresee, but all of this took a lot of time and effort to organise and facilitate.

It was the formalising of this study that pointed up many of these difficulties. Distance education tutors will always work with their students in different ways, and thus students who attend tutorials or communicate with their tutors receive particular experiences: for example, there was already guidance for tutors about recording tutorials for students with specific learning needs. Until we understand whether these alternative materials benefit student learning, we cannot know whether students who are not within such a study could be at any disadvantage. What is certain is that students always work with tutors in a variety of ways that are accepted and acceptable within the OU experience, and during the research I discovered that there were already OU tutors who were using similar media to those used by tutors in the study.

The exact scope of the research was not known until details were negotiated with tutor participants, and there were some necessary adaptations to what the tutors would produce (and therefore what could be discovered) as the

uses of the alternative media became more fully understood during the course of the research.

As an 'insider' researcher I was able to discover some information from what Bird (1992) calls 'knowing where to look' and having worked with colleagues. On the other hand the institution has a complex political structure with multiple resources and initiatives and it can be difficult even for staff to find out whom to ask, with a lack of centralised information sources in some areas, so there were limits as to what information could be uncovered. The field of this research is extremely fast moving and there were constant new developments in higher education initiatives, OU developments and technical advances, leading to increased unpredictability in the results of the research.

As Ball explains, the researcher's "self is critical in the conduct and understanding of ethnography in a twofold sense - in both practical and methodological terms" (Ball, 1993 p.33) and the researcher's role needs to be maintained in a way that is acceptable to participants and includes a high degree of self-awareness. It was therefore important that I was available to both tutors and their students in case of any concern, but that I was not too involved in the tutors' work and could attempt to remain objective. An issue in naturalistic research can be that participant observers become close to the participants. However, importantly, they are also attentive to the ways in which their own interactions may affect the responses and focus of their respondents. As long as they continue their awareness they can be close to the ways that changes or developments occur, and an important factor in the strength of the research is the discussion and analysis of other, differing views

and I have tried to keep to this approach. As Shavelson argues, "Education is centrally concerned with people: learners, teachers, parents, citizens, and policy makers. The volition, or will, of these individuals decreases the level of control that researchers can have over the process" (Shavelson, 2002 p.86), and I consider that it is vital that we always consider and encourage this individual input into the process so that we can gain more from the experience.

Further consideration of the limits of this research is addressed in Chapter 7.

Analysis

The analysis was primarily qualitative, collecting ideas in a descriptive study that included open questions and discovering the themes that emerged, aiming to be objective and impartial throughout. Some analysis took place while other data was still being gathered and helped to inform the development of new questions and approaches.

The initial questionnaire data was largely quantitative, although students were able to add comments. The responses were summarised for comparison and the student preferences for media use were compared with their use of devices or texting. Consideration of the comments helped me to develop my ideas about study resources (at that time) and later about the types of support media and services that students would find most useful. Further details are given on p.112.

The tutors and mobile learning study included questionnaires with open questions: two for tutors and two for students. These were coded by gathering the comments, finding emerging themes and linking them to information from the literature review and the student questionnaires: further details are given on p.124.

Similarly I coded and structured the data from the interviews, as described by Jones (1987). I had certainly considered what themes might come out of the interview plan but worked directly from the recordings, transcripts and notes to discover what emerged, linking to information about concepts and theories gathered from my previous research data, then bringing the interview data together and comparing similar categories to develop further conceptualisation.

Validity and reliability

Validity (whether the conclusions made follow from the evidence) and reliability (whether the work can be repeated with the same results) of research work and the avoidance of bias can be judged by the plausibility of the results, the credibility of the researcher's account, and the supporting evidence. The use of multiple methods of data collection offers greater support to the validity of the work, as the different data provide checks on one another. My research was designed to use multiple sources of evidence for this purpose, including a wide review of the literature; questionnaires from different samples of students at different times; questionnaires and reports from tutors; examples of resources that tutors developed; themes

extracted from interviews; additional information about related projects within the OU; and the results were questioned and checked against other possible explanations and related to theory.

Reliability was based on the way that the data work across themes, within the distance education context and with participants' perceptions. There is relevance to current or developing issues of concern in the field and I have gained new insights and a far greater understanding of the subject. This research is current and relevant, with mobile technologies constantly in the general and educational news (such as the examples already noted in Chapter 1 and within the review of literature).

Having considered the methodologies and theoretical perspectives of my work, I now describe how I collected the data in Chapter 5.

Chapter 5: Collection of data

> "Mobile learning is threatening - or is that promising? - to have a major impact on the world of e-learning and learning technologies. One theory that is emerging is that in the developed world many people, especially younger ones, are using mobile phones more than desktop computers" (Williams, 2006).

Since this quote was written, this increased use of mobile phones has become a reality, as discussed in the review of literature. However, just because mobile phones are used often and easily does not mean that they have an important role in learning, and I wanted to discover whether the use of phones and other handheld technologies could enhance study resources and support, not just for 'digital natives' but for students of all ages. Improved resources might improve learning skills, enhance the student experience, aid retention, and allow the efforts of staff to be focused on more complex issues.

Research can investigate 'what may be', not only 'what is' (Schofield, 1993). Within a climate of institutional change I maintained a wide-ranging review of new media applications and progress that might lead towards more extensive usage in higher education. In order to address my research questions, in parallel with the review of literature I conducted an initial survey to find out about student use of mobile learning technologies; developed and ran a nine-month project with 14 tutors and their tutor groups; and interviewed three senior experts in student support. Details of the data collection follow.

The initial study skills resources questionnaire - year one

My research interests were centred on discovering the possibilities and benefits of mobile learning technologies for the provision of student support within distance education. At that time I wanted to find out about student preferences for using different media on the web as well as about their access to these media by mobile technologies. Figure 4 shows the initial steps in my research process as I began my investigations.

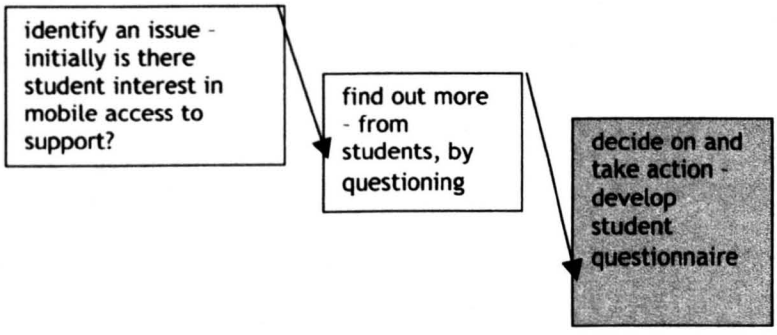


Figure 4: Initial steps in this research cycle

As an initial small-scale pilot investigation at this very early stage in August 2006 I developed a printed questionnaire about student media preferences and potential uses of mobile technologies and interactive processes on the web, and whether there was any relationship to their ownership or use of an mp3 player; mobile phone with web access; texting; or handheld computer. Each item had an explanation of the type of use that might be made of it, in case participants had not yet come across the different varieties mentioned (such as blogs and wikis).

Eight students took part, having been randomly selected from a database of

volunteers who were willing to be involved in the development of study resources. It was not possible to target particular demographics because of the limited numbers of available participants, but the eight members of the sample who completed the questionnaire (a copy of which is attached as Appendix 1) were mostly under the age of 35 with the oldest aged 65, on a variety of courses and equally split between female and male.

Following reading and annotation of the completed questionnaires including checking for missing or ambiguous data, I undertook a thematic analysis of the response data based on the question areas and gathered the responses into a summary, which is attached as Appendix 2. The data from the survey showed that there was no apparent link between any particular set of methods and the ownership or use of mobile technologies. Someone with an mp3 player might or might not want to use audio or a podcast for their study, and the same rule (or lack of one) applied to someone who used texting personally. A student might like audio but not podcasts, or vice versa, or dislike both. One enjoyed forums and liked video but not audio, another liked all three. For example, in the comments about receiving texts, two liked the idea of receiving OU texts, whereas two thought it was a personal medium not suited to this purpose, and a fourth said it depended on the content.

At the time there was only one person who was positive about web access through a mobile phone. Three made no response, and four did not favour option, as shown by their responses in Appendix 2.

What did I learn from this study? This small investigation illustrated that these students, like all of us, have preferred ways of learning and ideas about

study that are completely individual and could not generally be linked to their other preferences (although the student who supported the least options was both the oldest and also an academic member of staff who used none of the technical devices listed). It showed that it should benefit our huge numbers of students, with all of their individual preferences, for the institution to provide its study skills resources through a variety of alternative media and access options.

My original plan for this first year was that my initial study would be followed by the development and evaluation of study skills resources using the different media and technological processes. However, my literature review indicated that the speed of technological change and development within higher education (HE) and the institution would overtake that plan of action. Information from these questionnaires fed into the research process and I amended my earlier ideas. As a result I chose to consider different ways that such resources might be developed: at the time there was interest within Student Services in encouraging tutors to use mobile technologies in their communications with their student groups. Consequently I designed, developed and conducted the participatory AR study described below, which built on the questionnaire results in which at least one student had considered each new technology to be beneficial to learning, supporting my readings in the literature. Figure 5 shows how the questionnaire results fed into the development of this stage of my research, which is shown in the shaded box.

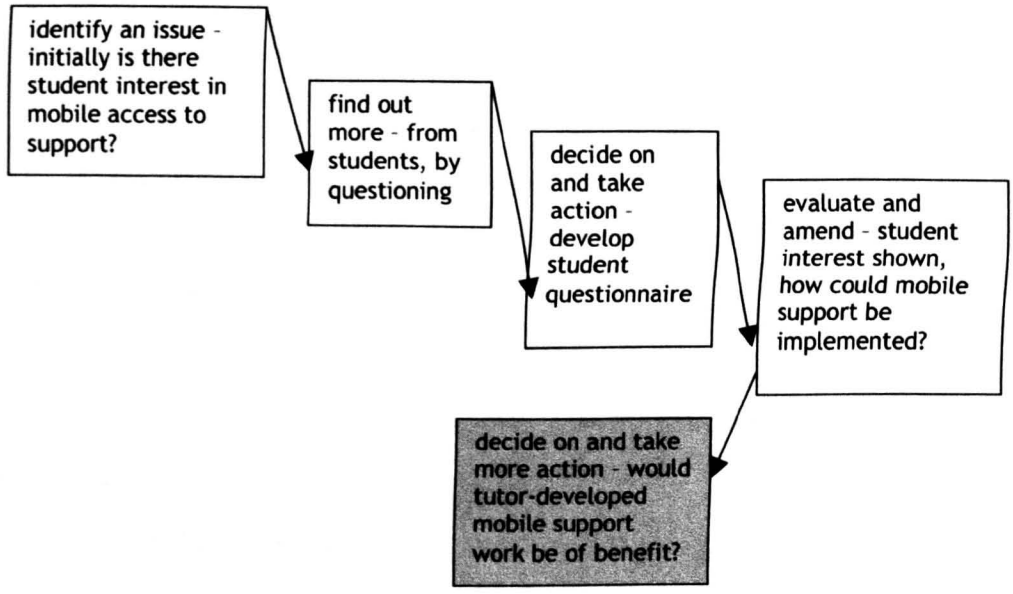


Figure 5: Results from questionnaire fed into development of tutor study

Tutors and mobile learning study - years one and two

Some aspects of this study have been covered during Chapter 4, during the discussion of the methodology. This section deals with the collection of data and its analysis.

This study was closely connected to my work within the OU, but I undertook the research and evaluation as part of my EdD because this depth of research was outside both my work remit and my work time. The study involved tutors and their students, although members of staff from other areas were involved in giving tutors funding, technical support, or permission to take part: these units included Associate Lecturer (AL) Staff Development and Support (ALSDS), Learning Design & Technology (LDT), staff from a number of faculties, and the Student Research Project Panel (SRPP). The study was funded through

Student Services and called 'Tutors and mobile learning'.

Role of researcher

As researcher I designed the study, obtained permission to carry it out, developed the research instruments, organised the workshops and tutor forum, and analysed and evaluated the data from completed student and tutor questionnaires and reports about their perceptions and preferences of the materials offered and the processes of development and delivery.

As part of my OU work I assisted tutors within the study by giving information and advice about the creation of content. During the study I developed online advisory material covering ideas, tips and techniques about using different materials that could be used by tutors and students. Other staff support is identified below.

Additional staff support

The ALSDS project manager contacted the tutor participants and organised the funding aspects of the study. Two members of LDT staff who had experience of a variety of media were available to answer technical support queries from tutors.

Aims of the study

The aims of this study were

- To consider the scope of mobile learning for supporting pedagogic uses and developing learning
- To investigate the use of mobile technologies and mobile devices to develop student learning and for tutor-student communication
- To inform and enable the development of materials that are appropriate for, and make the most of, access by mobile devices.

Identifying participants and introducing the research

A database of 344 tutors existed, listing their availability for additional teaching contracts. Each was currently tutoring at least one group of students. I wrote an initial message (attached as Appendix 4) to explain the research study, which would involve ten days of development work with an additional two days to attend a final workshop and for evaluation. Attendance at an introductory workshop in Milton Keynes was paid separately because it gave tutors the opportunity to decide whether or not to take part. I had originally planned and gained permission to run the study with five tutor participants, but more than 100 tutors responded positively to the initial message and I was able to expand the number of participants when additional funding was approved. From the group of volunteers the ALSDS project manager chose 16 tutors who could make as representative a group as possible across study levels, faculties, geographic regions and types of support or contact. They were teaching at all levels of study, from Openings through to postgraduate; across a variety of subjects in Business, Education, Health & Social Care, Languages, Law, Mathematics, Science, Social Science and

Technology; and in 10 out of 13 OU regions and nations across the UK. The type of tutor support that was provided was face-to-face, by phone, or through partly or wholly online courses.

I designed and ran the initial day's workshop for the tutor participants, which allowed me to explain the type of work that they would be encouraged to do and to demonstrate some of the different mobile and media options they might try, including audio and podcasts, quizzes and games, texting, blog, wiki or visual material. Tutors could also ask questions about the details of the study and consider the implications for themselves and their students on the individual courses on which they taught (which started at different times of the year). The methods they chose had to provide alternative options for students to access material, without students needing to undertake additional work. There was no prescribed method, and they were encouraged to use options that suited their own course and students' needs.

The 16 tutors were invited to take part in the study and 14 decided to do so (although one was subsequently unable to complete the work due to personal circumstances). Each tutor produced a plan of their proposed work, and some discussion was needed about the feasibility of some proposals. A sample plan is shown in Appendix 5, although some of the other plans were less detailed.

It was important that students received a consistent message about the study, so with SRPP consultation I wrote a draft message for tutors to personalise and use to introduce the study to their students (Appendix 6). The introduction explained:

You'll want to use your own words and fill in the part in brackets to suit your own work as well as give a title on the consent form. However we suggest you tell them something like this to give students the gist of the project without worrying them that they may

- be pressured to take part
- have extra work to do
- feel part of an experiment.

Tutors also received a consent form for students to sign, showing whether or not they were willing to take part in the study (Appendix 7).

The resources and communication options that tutors developed

Tutors developed a variety of materials and resources during this project. A free texting account was arranged for the four tutors who wanted to use this option. Some of the tutors used alternative methods of communication between tutor and students, or that students could share; some clarified topics and aspects of the course using an alternative medium; some offered teaching support about assignments that were coming or feedback on those that had been completed; others helped students to share their work with their colleagues, by putting it online or by recording tutorial discussions. Examples of these options are listed below in Table 4, although it is impossible for such a written list to transmit any idea of how interesting and engaging most of these items were in their implementation, despite the fact that their developers first had to learn the technical skills that were needed to produce them.

Although the project had been set up to develop mobile resources, in practice some were not accessible through the handheld devices available at that time, either because the files were too large or, in the case of crosswords, in a format that could not be accessed. Therefore the group discussion video, visual and audio for virtual microscope and mathematical processes, and law presentation were not mobile resources.

Table 4: Example materials developed by tutors

Description of content	Media used
tutor personal messages	mp3 audio
recorded discussions at tutorials	mp3 audio
recorded student group discussion about skills gained	video
the process of using a virtual microscope	visual and audio
how to work through a mathematical process	visual and audio
review of science and health topics	crosswords
topic reviews	quizzes
reminders about dates	texting
shared webspace for student work and comments	wiki
recording of tutor, attached to forum message	audio / mp3
science and health information updates	blog
law topic analysis	mp3, presentation

Benefits noted by tutors

These benefits were noted in the two tutor questionnaires and the final report, as well as during the final workshop. The sub-headings below show the themes that emerged from the response data gathered by the questionnaires (see p.124 for an explanation of the questionnaire analysis). Some examples of tutor and student feedback are shown in the Analysis section.

Student learning: There was positive student feedback and tutors said that they could see that students had benefited in many cases, as noted in some examples that follow. They found it a proactive way to communicate and provide resources.

Saving of time: Tutors felt that such work could save time, for example using texts to contact difficult-to-reach students, developing a bank of resources that could be used for more than one presentation, using a format or template that could be populated for a new group of students, or summarising common questions and answers for a student group rather than addressing these individually.

Tutor learning: Tutors enjoyed the opportunity to try different things and were pleased that they had learned how to produce materials in ways they had never attempted before, which gave them confidence to try other methods in future. Some (but not all) planned to do similar work for their next presentation of students, and I know of one who has continued her course blog (two years later).

Tutors learning from each other: Tutors felt that they had learned from each other's difficulties and trials, both through the forum and particularly from the final workshop where each tutor summarised what they had developed and how their work had gone. The traditional approach of sharing information and ideas can be greatly facilitated through technology, and can be used to advantage as a method of staff development.

Issues and difficulties

I identified the following issues from information gathered during the study and at the final tutor workshop.

Staff development: The study used innovative technologies with which the tutors had limited experience, so preparation was time-consuming: one tutor's technical development took several hours of staff support. This has great implications for staff development, even when the tools offered by an HEI are designed for clarity and ease of use.

Student participation: About 500 students were registered within the tutors' groups and had access to the materials (this number fluctuated over the time of the study as tutors began their courses at different times and courses were presented for different lengths of time). Some students had previously chosen not to be involved in any OU research process so could not be invited to take part in the study. 85 students were willing to take part and signed consent forms (although it is possible that tutors received others), but only 20 students returned completed questionnaires. Different tutor groups had a wide variation in the numbers of forms returned and tutors were asked to

encourage more student feedback, and it would have been useful to follow this up myself with the students because even a few more responses would have been useful. However, because the questionnaires were sent to students at a time set well before their examinations, I did not want to contact students nearer to their examination in case it affected their study for any reason.

Many students used and enjoyed the material (as related by comments to their tutors and in questionnaires) but others were unwilling to access them, partly (as recorded by tutors) because students apparently expected them to take up additional time. Most of the materials were, as planned, quick to use and effective for example in clarifying or reviewing course topics (and might have saved student time due to quicker understanding), but students could not judge their value until they had spent time in trying them out.

This work was necessarily identified and set up as a research study and explained as such to students, so perhaps this made students more wary of the materials than they might otherwise have been. This was particularly relevant to the numbers of students returning the questionnaires.

Technical problems: Few students had difficulties, and those seemed to be due to either firewalls at work or large file sizes. Some tutors had extensive difficulties in developing and offering the materials: due to a lack of technical knowledge; because they had to use public online spaces and unfamiliar software (as the VLE was not yet available); because of difficulties with hardware, such as microphones and sound quality; or incompatibility with using a Mac computer. It took tutors longer than they expected, and

they mentioned the steepness of the learning curve.

Access to materials: The lack of an integrated learning space was a particular problem. Other online spaces had to be provided to hold different types of file, blogs and messages, and students needed instructions on how to find these. (The VLE has overcome much of this difficulty and the study would now be easier to run.) Most students seemed to use their computers to access the materials, but some certainly used and appreciated the flexibility of mobile access.

Ability to re-use material: The tutors involved now have clearer ideas about what materials could be provided for a succession of students and what needs to be individually prepared for each presentation, which was hard for them to judge at the time.

Mobility of materials: Although the study was originally designed to look at materials using various different technologies that could be accessed by mobile devices, tutors' primary focus was on ways of supporting students and the results of their developments were not always 'mobile'. Mobile materials are in fact just one area in a spectrum of student support resources that many tutors are already creating independently.

Although not all materials were equally successful in engaging students, it was shown that they provided useful alternatives for a number of students, and were particularly helpful for those unable to attend tutorials.

Other problems with development: One tutor could not produce the informal tutor-group-based materials she had planned because the course

team asked her to produce formal learning materials for the course. One tutor had to withdraw due to domestic difficulties. These illustrate potential implications for tutor support regarding skills, time and workload.

Analysis of data from the study

Two questionnaires were sent to the tutors and relayed by them to their students: a completed sample of the preliminary questionnaire is attached as Appendix 8, and a completed sample of the final survey is attached as Appendix 9. A set of student responses is attached as Appendix 10, containing additional comments gathered by one tutor from emails and the tutor group forum.

To analyse the data from the questionnaires in this study, I checked for errors or missing data, then prepared a coding frame for each one, as suggested by Swift (1996). Initially I listed the questions and the variables for closed questions. For the open-ended questions I read and keyed-in the responses and sorted them into similar issues. The responses were re-sorted until a number of different response categories or themes emerged that were of interest in my research and, where possible, could be linked to information from the literature review and the student questionnaires.

Student responses showed that most of those who took part and who returned the surveys appreciated the use of different media, sometimes for their flexible access (this student wanted more resources):

> "I would love to have longer resources to conveniently download onto my iPod that I could listen to when commuting." Student 6 (response to: Please describe any further resources that you would like me to develop)

as a way of feeling included:

> "I think it's a brilliant idea, especially if you are not able to go to tutorials as it makes 'me' feel part of the course. I wish my other course had this. I have also played the podcasts to a friend, who is studying with the OU, but not this course and she too thought it was a really good way for enhancing the course." Student 13 (response to: Would you recommend the use of any of the resources to other students on [course code]? Please explain your answer)

or because it felt personal and non-threatening to a new student on an access course:

> "I found that the audio material and the tips felt more personal and less scary than just working through the materials on their own. It made me feel that the tutor was talking to me. ... The course materials on their own and even the telephone tutorials are quite intimidating when you haven't studied for some time. ... [The wiki] also picked up on things that I was worried about such as referencing and tips on the essay writing. It helped me to feel supported but not in an overbearing way." Student 3 (response to: Did the resources enhance your learning? Yes/No. Please explain)

I was interested to find that some felt more a part of the OU community, even when they were unable to join their peers at tutorials, and these types of response prompted my further investigation into the affective possibilities of mobile support.

Tutors also completed two questionnaires: Appendix 11 shows a completed sample of the questionnaire sent during the study, and Appendix 12 a completed sample of the final questionnaire. I asked tutors why they thought these materials worked in a particular way, and some comments follow, taken from the final reports that tutors submitted to summarise their experience. The following three tutor comments were made in response to Question 10 in the final survey to tutors: Can you say how or why the materials might have worked in this way? This first comment was echoed in other feedback: some students found that alternative media provided them with other ways of learning that sometimes better suited their learning preferences:

> "materials provided new ways of reinforcing previous learning using an informal approach that students told me they enjoyed." Tutor 2

Another tutor video-recorded a discussion, during which students became aware of their increasing key and transferable skills as they came to the end of their course:

> "feedback on the area of video was extremely positive and the students did not previously appreciate how good they [the students] were." Tutor 8

A mathematics tutor did not have a tutor group forum. He developed commentated video covering mathematics problems that explained processes step-by-step where students need clarification:

> "I suspect that the benefits are rather like those of the audio sections already used in [course name]. The linking of the text to the commentary may help to focus attention, since only the relevant text is visible in the clips." Tutor 4

This next quote illustrates the important issue of the human response to voice. Some distance learners who cannot attend (or do not have) face-to-face tutorials and do not respond to telephone calls may never hear their tutor's voice. Online forums offer a great method for making contact and clarifying problems, but a person's voice transmits so much more that people respond to. This could be a particularly important issue for students returning to study after many years, as many are unwilling to make contact with tutors: if they received a short voice message perhaps their reluctance could be overcome. One tutor discovered, for example, that a recorded introduction could be attached very simply to an email message in the tutor group forum:

> "I think students liked to hear my voice - 'friendly and approachable' even though they could not get to tutorials. One student wanted to listen whilst working out at the gymnasium." Tutor 11

Tutors using these alternative methods found that they suited different students' own preferences for different types of material. This could benefit students who learn better for example from auditory or visual material.

Additionally each tutor wrote a final report about their own work and several of them reflected on their aims and the results for themselves and their students. For example, this tutor's comments in her report note the benefit

of the resources for review and revision and to help support their learning, and show how students could feel connected to other members of the institution.

> "although there was not a great deal of discussion ... they found the material useful in ways that I had not predicted: they provided an opportunity to revisit the work that had been done in the tutorials, to understand it better, and to notice details that they had missed the first time. They also served as useful aids to revision, and they helped students feel more connected to the group and to the course." Tutor 1

The next comment from another tutor's final report shows how distance students welcome alternative materials when they are unable to attend tutorials (although support may be needed in making the best use of them): in this case the student was studying outside the country, but many students are unable to attend tutorials for various reasons.

> "There appears to be a demand for podcasts from the cohort of Central European students, as they cannot access tutorials. There appears to be a need to educate students as to the skills required to access podcasts." Tutor 13

Anecdotally, in the final workshop two tutors reported that students had said that texts were beneficial because they were more noticeable than emails, which would be of particular benefit for prompts and reminders.

Results of the study

The tutor staff development aspect was an important part of the investigation and evaluation of this study: could tutors use these types of tools to develop their own resources and materials? The tutors spent a lot of time on this work, and for some the technical difficulties meant that they needed a lot of central support. The complications were exacerbated by the need to work with external tools, because at that time the institution's online tools were not yet available through the VLE. Although there is an institutional central computing helpdesk available for staff technical queries, it would be difficult to support over 7000 tutors with complex development issues, so any tools that the OU expects tutors to work with must be simple to use from the outset and have clear instructions available.

As a result of this study some additional material was added to student and tutor online resources about the use of mobile devices and recording software. Some tutors in the study have written case study material which is being incorporated with the VLE instructions to provide other tutors with ideas and tips about when and why to use blogs, wikis, voice recordings and other VLE tools. The provision of all these tools options within the VLE area has greatly simplified the work that tutors need to do to offer such alternative options.

Many of the tutors involved were keen to continue their own development and enjoyed finding out about these new options, but not all would commit their own time to doing so in future. Learning how to use a new tool or medium can be time-consuming and becomes a 'cost' to the tutor: this cost should be

included in courses where new tools are to be used.

A summary report of the study was provided for Student Services and is available on the institution's Knowledge Network (an institutional document-sharing area).

OU tutors generally have an informal approach to their communication with their students, and this was used in the study by the great majority: this echoes the work by Mayer et al. (Mayer et al., 2004) mentioned in the review of the literature, where personal wording aids retention and the transfer of learning.

A large number of tutors were interested in taking part in the study, which seemed to show a general interest in the topic of mobile learning. However, I would note that many part-time tutors would welcome a 12-day contract.

Evidence from this research study showed that materials in alternative formats and media were appreciated by a number of students and helped to clarify course topics and areas that were hard to understand. More importantly in terms of this research, because of its focus on student support, the resources helped them feel part of the tutor group or the study community, even when unable to attend tutorials to meet their tutor and fellow students.

Once again the results of this research fed into the research process, and this stage is shown in Figure 6.

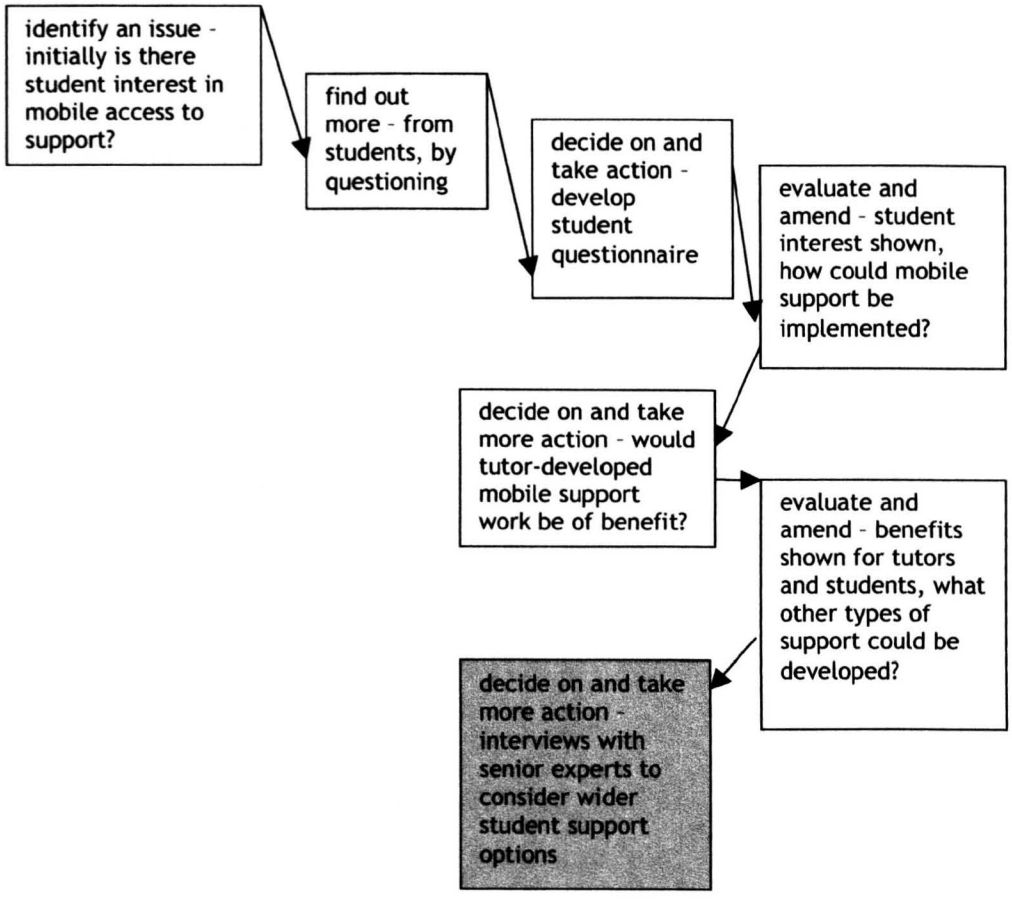


Figure 6: Results from tutors and mobile learning study led into interviews

I next considered the ways in which the different types of resources and media (such as those that the tutors had developed) could meet the support needs of distance students, more widely than as tutor-provided support. This change in focus was prompted in part by the way that students appeared to have felt benefits beyond course-focused 'mobile learning', such as the clarification of subject topics or the chance to review what they had learned, and had reported for example their feelings of inclusion in the student group or connection with their tutor. At this stage I needed to know more about different aspects of student support: although I had been a distance student

as well as a distance tutor myself and had worked with members of different institutional units such as assessment, disability and careers services, there were aspects of distance support that I did not know much about. Accordingly I expanded my literature research to student support areas, and arranged interviews with senior experts who had long-term experience of student support for distance learners.

Interviews with senior experts in student support - year three

I conducted three interviews during July and August 2008, when I was investigating the range of student support and the extent to which handheld technologies might be used in distance education. The main purpose behind these interviews was for me to obtain ideas about important areas of study skills that could help students to progress, and the different aspects of the student support provided by HEIs, so that I could then develop my ideas about if (and how) these might use mobile technologies. These interviews were undertaken at a stage where I had gathered evidence from the literature, the questionnaire and the tutor study, and a number of OU developments described in Appendix 15 (including the texting study) were providing further relevant information, and I was additionally becoming interested in the affective aspects of study. Gillham (2000) talks about the benefits of interviewing experts in a topic and the importance of waiting until a stage in the research investigation when it is possible to identify the key issues that can best be answered in this way.

Each of the three people interviewed had many years of expertise in the field of student support and have been published in leading journals. They had all been distance education tutors and staff tutors, and had worked directly with both students and other tutors for many years. They each had additional experience which was important to my investigation, having been early champions of different types of resource and support provision: Interviewee A had developed an innovative study that established that advice and guidance could be provided electronically through the web, and had worked in student services at campus-based University Y; Interviewee B developed student skills workshops, materials and tutor resources, and had a strategic view of central, regional and tutor-provided support; Interviewee C had researched and developed a wide range of student support services and materials that had been provided through different media, and had more recently been researching the use of mobile technologies.

In semi-structured interviews (as discussed in Chapter 4, plan in Appendix 13) I explored their views on the important skills for effective distance learning and how students might be supported in their study by HEIs. Although I had developed an outline structure and further probes, the interviews were fairly informal and their structure changed slightly with each person as I explored their statements and ideas and followed some of these up with later interviewees. I used a digital recorder and took typed notes and from this recorded information I identified the points that each person had felt were most important so that I could categorise and summarise their responses. An annotated extract from the transcript of Interview A, showing initial coding, is attached as Appendix 14.

Interviewee A considered that students should be helped to identify their needs in relation to their study at particular times in their student career and that the key skill was for them to learn how to learn, so that they could ultimately self-assess how they learn and how to improve their skills.

> "I think what you need to do is look at the student life-cycle and help the student identify what their needs are in relation to their studying. And of course when they start they don't know that. So it's about helping them to learn how to learn and helping them to self-assess how they learn and what they may need to do in order to learn more effectively, or for many students it's not just effectively it's more efficiently: time, time as well." Interviewee A

She also supported the importance for students of identifying where they need help in terms of learning development, and that personalised and tailored resources to suit the individual student works better for them than generic material. A recognisable problem for new students is that they cannot yet identify their needs. She considered that texting had a possible support role, partly because texts were free to the recipient. They had been used to a low level at University Y to remind students of times and dates, or suggest events relevant to their interests and based on the student's study cycle. Texting could also provide proactive support for affective issues such as persistence or motivation, although she emphasised that the wording and frequency must be developed with care because what may motivate some may de-motivate others, and it was also essential that this was an 'opt-in' choice for the student.

A topic that I had not previously considered was this interviewee's point that the centralisation of a large distance education institution could offer an advantage in terms of being able to send mass electronic mailings: other universities are devolved and dependent on individual lecturers working with the new technologies, and although more frequent contact can result in a closer tutor-student relationship, it does bring huge staff development issues. An OU texting study (described in Appendix 15) showed me that mass text mailing can be efficiently organised for a course cohort of over 4000 students, and the tutors and mobile learning study showed that it can also be used in individual situations.

She also mentioned that the delivery benefits of handheld technologies in terms of portability, speed and flexibility also offered opportunities for communication and contact, such as through texting, that were rather like what she called "corridor conversations", informal communication for quick information updates or just to keep in touch, and that these could prove to be supportive. I felt from this part of the interview that handheld technologies were offering what might be called 'opportunistic' access to learning and support.

The themes that emerged during this interview supported some ideas about texting that had been identified by the tutors who had used texts in the tutors and mobile learning study and that were additionally emerging from the texting study, about using texting as an informal mode of supportive communication and to help students organise their learning. The important student skills were in learning how to learn and being able to self-assess their

needs, and HEIs should offer proactive personalised support to fit the student life cycle. I thought that if mobile methods could also support students to learn how to learn and to self-assess their learning needs, this could benefit their future learning.

Interviewee B similarly emphasised that the starting point must be the individual student, with resources and information shaped to them. It can be dangerous for institutions to think of students in categories, and although generic resources can be a central resource mediated by tutors, they do need to be individualised to the particular student in some way.

> "The starting point is always the individual student. It is possible to be proactive to a category of students - for example to Level 1 - but it is dangerous to think of categories. The information that is given out and the resources that are available very much need to be shaped to the person." Interviewee B

I agree with both these interviewees that ideally HEIs should tailor their services to the individual and contextualise them to the course: giving students the option of choosing the means of communication and the method of information access would be one step, particularly now that it is easier to pull student data into the digital communication so that students only receive relevant communications or material. Although personalisation has been a rather elusive ideal over the past few years, improved methods of drawing information from institutional databases and linking the details to information or resource templates is now possible. The best way to provide such support resources and services would be contextualised through the student's course,

but this is still a complex issue for an institution that offers several hundred courses.

Interviewee B thought that voice was an important aspect of contact, and that the experience of email or text "is dead compared to sound" because the voice gives the listener added information, and for example during a telephone call it is often possible to identify other problems. She considered that the success of Openings courses (introductory access courses for new students) is due to the fact that telephone-based support detects problems and tutors give supportive advice with the right tone. This part of the interview linked with the proactive student support work by Simpson (previously mentioned in Chapter 3) and was also supported by the reaction of students in the tutors and mobile learning study who appreciated the sound of the tutor's voice. This interviewee had no experience of using mobile technologies but thought that examples from the tutors and mobile learning study illustrated some valuable options: it is to be noted that one of the tutors successfully used materials, including a blog and texting, within an Openings course.

Interviewee B was also convinced that there are generic skills that make a difference to the success of distance learners: key skills such as reading, writing, communicating, information technology and numeracy, that underpin all study but need to be contextualised into subject areas. As with Interviewee A, a reflective approach to study is fundamental - 'learning how to learn' - in learning from good and bad experience: knowing about one's own learning, the ability to act, to get feedback on a task, and close the loop

by some form of reflection about what has been learned. If students cannot learn from experience and where things are good or they need to improve, study is much more difficult for them. Reflection itself can be a difficult process, but novice academic learners can be given simple tools to use that will help them assess themselves and improve their skills, such as the prompt: 'one thing I will do in future after I have my assignment returned is ...'. She believes that not everyone can reflect, as it requires the ability to be self-critical and honestly self-assess, but supported the need for reflection as an important element of learning. This could improve self-confidence, which is also helped by being able to consult with staff or peers through support systems. Interestingly she thought that real voice was more beneficial than other electronic, more text-based communication methods, which I had decided myself after analysing the tutors and mobile learning study data. It has been shown that skills resources can be mobile-accessible and can include the use of recorded voice messages, and I am sure they can offer prompts for self-reflection that are linked to the individual study cycle.

Interviewee B considered that raising awareness of the affective aspects is very important, but while some tutors automatically address this side of learning and support their students, others do not see the value. The advice to a particular student must be individual. Learning is emotional, in that it alters self-perception and what you learn from your study. "The wonderful thing about being involved with OU study is that you see enhanced student confidence, which helps them learn more effectively".

Interviewee C proposed three types of skills for students: intellectual ability (which he regarded as not the most important); organisational and self-management skills; affective skills such as managing the stress of being a learner, the ability to concentrate and manage distraction. He had doubts about learning skills and was not sure that they exist, as the evidence is mixed, and while he considered that remediation of skills does not motivate for higher achievement he felt that there is agreement that learning motivation is needed first. He described a regional retention project that predicted the probability of success of OU students based on their data, against a control group (described in the literature review). As a result of the 5% improvement in success rate prompted by one ten-minute phone call, proactive support has now been mainstreamed, and those who are contacted do better than those who are not. Individual students always give a positive response to the call, and it is the contact rather than the content that is important. Staff accentuate the positive and deal with queries, and find that during this initial call students share their early concerns. Although they might not initiate the contact, they appear to appreciate the opportunity to talk and the climate of support that is demonstrated. I consider that follow-up opt-in texting systems could fill gaps in this service as funding becomes more problematic. The type of wording used in the texting study (see Chapter 6) was very much based on emphasising the positive, and this fits well with the positive psychology that Interviewee C so values, concerning hopes, expectations, strengths and positive attitudes. He also referred to Keller's ARCS model (previously referred to in Chapter 3) and at this stage I could see that handheld technologies would be a suitable delivery method that would

fulfil the four considerations (attention, relevance, confidence and satisfaction) of that model.

Like the other two interviewees, he believed that the affective aspects of students' learning are most important, as his own research has shown, and felt that validating effort rather than achievement could produce better results and keep students going. He argued that the best predictor of student success is motivation: someone who is motivated believes they can change things through effort and this motivation can be encouraged by a proactive institution, as shown in the research described in Chapter 3.

> "It is my central belief that we all have lots of motivation but - it's when you come across someone who is apparently unmotivated - that it's not actually a lack of motivation it's that they have not had it switched on, and that if you could actually help people switch on their motivation - I realised that a sense of 'switching on motivation' is really what I had been looking for." Interviewee C

Although a positive attitude can be encouraged, he has found that the students who need the most help usually seek it the least, which is why a proactive approach to student contact is important, particularly during the early part of a student's study career.

Once I had analysed the points made by these interviewees I found that the main themes that arose were these.

From the institutional perspective:

- students must be seen primarily as individuals
- support should be proactive, and be personalised and contextualised to individual need within the student's study journey
- centralisation of digital methods could lead to efficiencies in both effort and resource development.

From the student perspective:

- learning how to learn and how to self-assess can improve study effectiveness
- informal communication can provide supportive contact and may help in developing motivation and other positive affective skills
- using 'voice' is a strong method of communication that transmits far more information than written text.

As the next step in the research process I pursued these themes as I looked into the affective aspects of study in the literature, and considered how it might be possible to use informal communication through voice or texting to enhance students' understanding of their learning and develop positive attitudes to their study through the use of mobile technologies, and the importance of contextualisation and personalisation of student support within their course of study. Additionally I wondered how proactive centralised support could be provided within a distance education institution.

Returning once more to the research questions:

1. What is the relationship between mobile learning technologies and the development and enhancement of student learning in higher education?

Questionnaire responses showed that some students were interested in using mobile technologies to access learning resources, information and services. Evidence from the tutors and mobile learning study showed that alternative mobile options used for communication and for accessing information and resources were beneficial and offered additional unexpected results such as an improved sense of connection.

2. What are the main drivers and barriers that encourage or dissuade students from making use of mobile learning technologies, and how might these influence the nature of the student support offered by higher education institutions?

Some students responding to the questionnaire indicated that they would use mobile technologies, and some in the main study welcomed the additional flexibility of access and the media richness of mobile technologies. Barriers to use were linked with a lack of sufficient knowledge about what was being made available by their tutor and the time that might be involved in using the alternatives. The fact that this was part of a research study might have influenced the uptake of the alternative support.

3. If the use of mobile learning technologies enhances the student learning experience within a distance education context, in what ways could HEIs make use of these mobile learning technologies for student support?

It has been shown in the tutors and mobile learning study that tutors are able to provide alternative support using a variety of mobile media, directly suited

to the needs of their own students. The interviews suggested further support ideas that might be enabled by handheld devices and services.

At this time a number of developments in the OU were involved in mobile learning. In a similar way to the information gathered through the literature review, these OU developments gave me insights into the uses and benefits of handheld technologies for student support. Appendix 15 summarises the work that was ongoing at the time, and describes a project using SMS texting with which I was involved as part of my OU work.

This added input to my research is shown below in Figure 7, which represents the information gained from the literature review, data collection and other sources (see shaded boxes), all of which influenced my thinking. For example, handheld technologies in the OU offer ease of access and increased opportunity for various purposes: course provision through the Enabling Remote Activity project for fieldwork or using SMS texting in the psychology course; offering additional resources through iTunes U[niversity] or updating students through RSS feeds on the student Platform news area. Additionally, the texting study showed that course-developed texting can provide student support and lessen the feeling of isolation for some students, while the use of Web 2.0 communication options such as Twitter and Facebook allow informal contact with the student community, also identified as beneficial through the interviews described earlier.

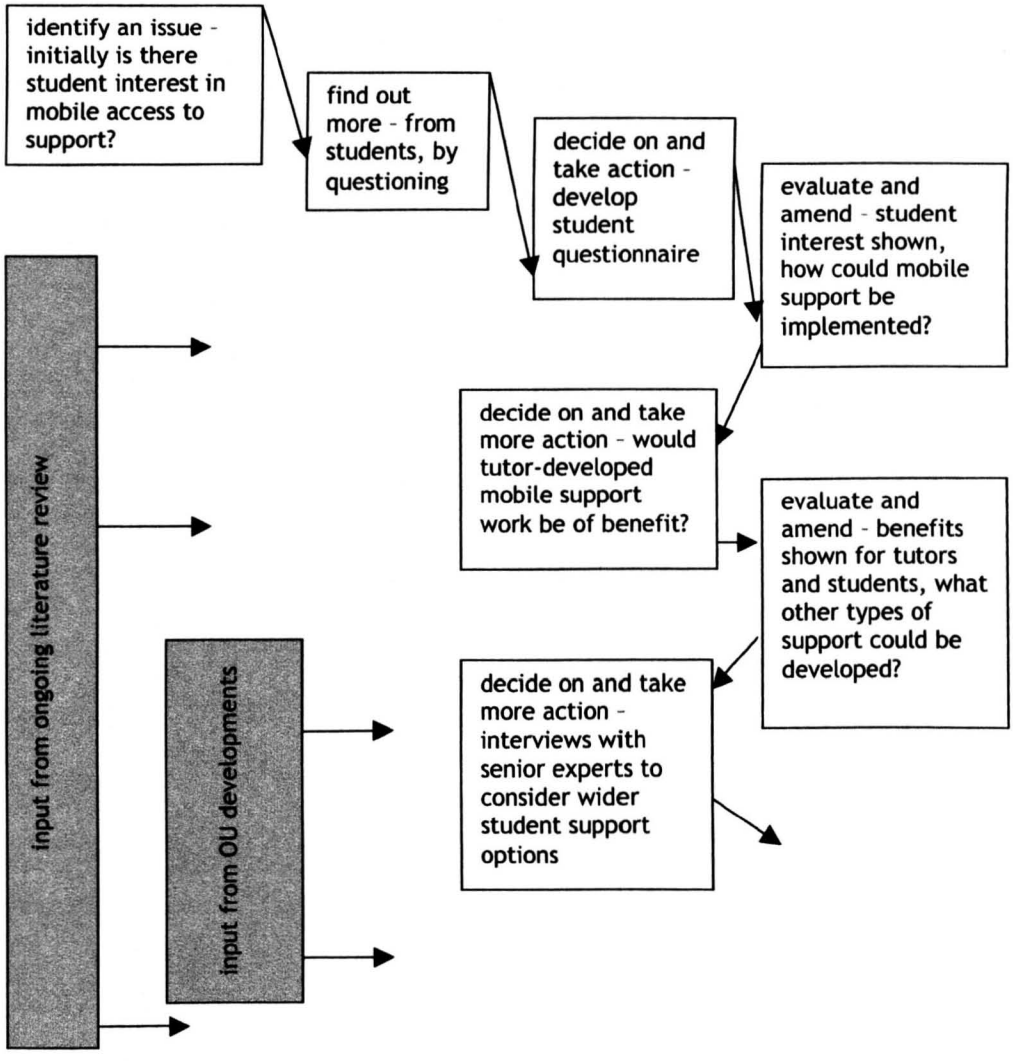


Figure 7: Literature review and OU developments in the research cycle

In Chapter 6 I now discuss my research.

Chapter 6: Discussion

My aim in this research was to investigate the relationship between mobile learning technologies and the development of student learning, with particular focus on issues of student support, and including a consideration of the drivers and barriers that affected student use of mobile learning technologies. If it was found that these technologies enhanced the student learning experience, I wanted to consider some practical ways in which HEIs could use these technologies for aspects of student support.

Chapters 2 and 3 covered my review of the literature on the areas of handheld technologies, m-learning and student support. These were followed in Chapter 4 by an overview of the research methodologies I chose and the reasons for doing so. Chapter 5 covered the collection of data during the research process.

I will now discuss the research data in relation to my research questions. Later in the chapter I show how the research has helped me to develop a model of student support that can be effected using mobile technologies.

Research question 1:

What is the relationship between mobile learning technologies and the development and enhancement of student learning in higher education?

From my review across the literature, mobile learning seems to be a new form of learning that has a variety of different uses and methods associated with it, and is being driven by the use of handheld devices in society. These uses are

developing as researchers and practitioners discover ways of working with particular groups of students in different contexts. This is the latest in a series of technologies used in education, and one that institutions can use to advantage because the devices are already in the student's possession.

Research within this project and by authors reviewed in Chapter 2 (notably Attewell, 2005, discussed previously on pp.26-27; de Freitas and Levene, 2003, on p.84; Kukulska-Hulme, 2005a, on p.24; Stead, 2005, on p.25) has shown that students, wherever they are and whenever they decide, can access information and learning resources in a variety of media to suit all preferences, that are particularly useful for small learning objects, workplace and fieldwork, revision and review of learning. Additional channels of communication can be facilitated across the institution, improving options for collaboration and creativity. Support from members of staff using mobile technologies may encourage positive feelings of inclusion with the educational community and result in improved motivation.

Research question 2:

What are the main drivers and barriers that encourage or dissuade students from making use of mobile learning technologies, and how might these influence the nature of the student support offered by Higher Education Institutions?

Barriers:

The literature in Chapter 2 has shown (for example in Colley and Stead, 2004, discussed previously on p.54; Wager, 2005, on p.32) that there have been physical barriers to using mobiles, such as screen size (these are getting bigger); limitations of the input interface (which are being developed and now for example include speech input); durability and costs (to some extent now balanced by the number of additional features and by the bundling of calls and texts through contracts); ongoing bandwidth reliability and restrictions (also less of an issue).

Similarly, copyright and legal questions have not yet been clarified when working with these new tools and sharing materials, although those topics have not been addressed here (as explained previously in Chapter 2, p.51). Economic barriers do not seem to be as much an issue as they have been for computer access (as noted by Ramaley and Zia, 2005 and described on p.54), as more people have a mobile phone than access to a computer, although there are ongoing costs.

It has been shown in the literature in Chapter 2 (among others, by Colley and Stead, 2004, described on p.32; Danielsson, 2004, on p.54; Hedberg, 2006, on p.55; Salmon, 2005, on pp.24, 52-53; Stone, 2004, on p.55) as well as in the tutors and mobile learning study that it is complex to design learning for mobiles, partly because of the range of platforms and lack of standards. Development of suitable materials and services need careful design to make the most of the mobile benefits and avoid the technical limitations described above. Increasing experience in developing materials and a sharing of

expertise and good practice will help in this area. It can only be hoped that the recent adoption of a standard for mobile chargers will lead to further standardisation. In the meantime, the use of the mobile web offers a solution.

It seems clear from authors covered in Chapter 2 (for example Smith and Oliver, 2005, see p.42) that different types of ICT (including handheld technologies) have their own particular digital literacy needs, and staff and students may struggle initially until they develop the required skills. Even students who own devices may not use all the features, understand how to use it most effectively, or understand the implications of how they use it. For example, students need to know that personal information that is shared with others can sometimes remain available indefinitely and may become problematic over time. I believe it would be useful for educational institutions to identify the particular skills that their students should develop, and at the same time to foster a positive environment for trying different media and methods of learning.

From my working life I know that academic staff and tutors need information and awareness of the potential benefits of these alternative materials and tools, and the time and the opportunity to develop the necessary skills: here again is the issue of staff development that was mentioned in the literature and by interviewees and tutors in the study. Distance education institutions have to provide ongoing staff development about the use of ever-developing technologies. Resources and services need to meet the quality control standards that help to ensure the institution's reputation. Tutors in the

mobile learning study felt that they had gained confidence from learning how to use new technologies and had also learned from sharing their experiences with each other. I suggest that the relevant handheld technologies themselves could be used when developing learning material for and about the different types: that is, people would receive and respond to texts to learn texting, or record and upload audio files to a forum to learn which types of audio work well and which do not. Such learning objects could be supported by case study material from members of staff who have already used those technologies.

The institution's VLE now offers the tools for developing materials, whether through audio recordings, wikis, blogs or other activities. In many ways this is a driver, in that it eases access to those tools, but unfortunately an educational VLE does not offer the same type of attractive interface, clear usability and additional facilities that can be developed by online providers who rely on these features to entice mass users. Consequently, the design aspects of the VLE tools are somewhat limited and may discourage some students from using them.

Drivers:

The Department for Education and Skills (at the time of writing Department for Children, Schools and Families) 2005 e-Strategy report Harnessing Technology: transforming learning and children's services, contains a summary of what new technologies can mean to learners, with

- "More ways to learn

- More subjects to choose from
- More flexible study
- Easier ways to try things out
- A personal online learning space
- Help to move on" (DfES 2005 p.11).

From this and many other examples in the literature that have been reviewed in Chapter 2 it is clear that the flexibility and portability of m-learning allow people to use small amounts of time for their learning, including for retrieving information, checking facts or schedules or reviewing sections of material that are either accessed online or downloaded to the device. Learning can be reinforced in a new way, with repeated practice and reinforcement through small chunks of material. The constraints of the small screen and some limitations of input choices mean that brief is better in m-learning but learning objects can include quizzes, games, multiple choice questions or focused tests and employ multiple media, as shown in the tutors and mobile learning study.

Having a device that is either always 'on' or at least quick to connect gives immediacy and facilitates 'just in time' access. These are valuable benefits for distance students, the majority of whom are employed and whose study time is limited. Handheld devices can be used anywhere and might suit distance students studying from other countries, although their access might be more costly. People appreciate the large memory and capacity within a small sized device, as well as the additional features that allow students to take and share photographs or video, access email or texts for

communication, keep notes, use the dictionary or calculator, store files, record and listen to sounds and voices, or organise and plan their time.

Additional accessibility is offered by mobile technologies because, as Rainger has stated (2005), the feature of mobile learning that strongly promotes accessibility for all students is "anywhere, anytime access to learning material" (Rainger, 2005 p.67) and this point is widely covered elsewhere in the literature. Some students in the tutors and mobile learning study stated that they used the materials in a variety of different places and at times that fitted with other parts of their lives (such as when travelling or exercising). As I noted in Chapter 3, handheld technologies can replace the flexibility within distance education that was partly lost through the use of fixed, desktop computers.

My literature review has provided examples from a range of authors who have investigated mobile and handheld technologies. Together with the results of my own research these show that digital technologies can offer communication and community tools and alternative ways to absorb content or transfer and store material. Distance students, including those who are disabled, can gain feelings of inclusion rather than isolation.

As shown in Chapter 5, tutors in the mobile learning study felt that they could save time by preparing resources and communications that could be used by more than one presentation of students, and could be sent to all students in a group when relevant rather than for answering an individual query. These materials were particularly helpful for students who were unable to attend

tutorials. Such mobile options are just one type in a spectrum of student support that many tutors now provide.

Research question 3:

If the use of mobile learning technologies enhances the student learning experience within a distance education context, in what ways could HEIs make use of these mobile learning technologies for student support?

Evidence from the tutors and mobile learning study has shown that distance education institutions could use a variety of mobile options: for example, texting combined with the current proactive phone calls could make a real, cost-effective difference to student retention, adding to the personalisation of the learning experience.

Texting proved to be popular with the students who used it in the study, although it may not offer a cost savings to the institution or reduce the number of emails sent, as students may want both options. Systems that allow students to choose their preferences might change this attitude once students are sure that what they chose would be delivered in the medium they prefer and that they can make changes so that, in time, texting might replace emails. The institution would need to consider how the 'added value' of support could be offset against the extra cost of texting or similar methods, but a cost-benefit analysis might show that use of texting, like proactive telephone support (Simpson 2006), is not only absolutely worthwhile for the student but at the same time benefits the institution.

My initial hypothesis about the use of mobile learning (that now admittedly seems rather vague) was that it might offer an option for students wanting to access the type of study support material that is available online, such as information and resources about improving study skills. In fact during the time of the study some mobile additions were made to these study resources, but as my research progressed and I considered the results I became interested in the affective aspects that could be addressed through these materials, such as motivation, social cohesion and engagement and their links with learning, understanding and study success. It was notable that the student responses about their feelings of engagement with the tutor in particular, and a feeling of a more personal contact in general, were noted by students in the tutors and mobile learning as well as the texting studies, and I believe that the appropriate design of mobile materials and services would encourage such positive attitudes.

While texting can be used as a mass communication system, much of which can be automated (as shown in Appendix 15), it is equally possible to personalise digital communication and materials to individual students (as in the tutors and mobile learning study), which helps them feel that they are part of an organisation that knows their individual needs: this too can help to create a generally positive attitude to their study and encourage them to continue. The importance of starting with the individual student was an aspect that both Interviewee A and Interviewee B were keen to emphasise. Such personalisation can be done by their tutors, who could perhaps suggest options that would suit a student's study preferences or their individual context, or by using student record database information to personalise the

message or resources for particular student groups. I noted earlier in the mobile learning study a student response that the alternative material made her feel "that the tutor was talking to me" and this increased sense of closeness to the tutor was supported by other student comments. A large distance education provider can have problems because of its size and complexity, and should employ methods that help to make students feel part of a collective purpose and be involved with their educational community.

As identified in Interview A, using text messaging systems can work particularly well in a distance education institution because of the centralisation and the ability to communicate with both large numbers of students and individuals. Services and systems can be designed to suit both student and institutional needs. Reminders can help students to keep to the timetable, which might be a way to remove some of the stress that less organised students can feel when they have deadlines to meet. For example, several students in the texting study had mistaken the dates when their assignments were due, and missing an assignment can be a factor in students withdrawing (either actively or passively) from a course.

One emerging benefit of mobile learning is the option of listening to rather than reading learning material: this came out during the tutors and mobile learning study. Despite the increase in additional richer media in the production of distance course materials, all distance students still need to do a lot of reading, which can be particularly hard for those with visual impairment, dyslexia or manual dexterity difficulties. Distance learners have limited opportunities for listening to other people talk about their subject or

about study in general. Clark and Walsh (2006) support the benefits of audio because of its advantages: "Listening is instinctual, reading is not; ... Listening gets round dyslexia; Listening frees eyes and hands; Listening is a mobile medium; Listening and learning go hand in hand" (Clark and Walsh, 2006 p.6). I suggest that listening is perhaps under-used in distance learning: mobiles can make use of podcasts on topics relating to the subject under study, or from experts, or about associated news items. Music or the sounds of nature, people or places can provide atmosphere or context to encourage the feeling of immersion in the learning experience. Tutors can give general audio feedback on an assignment to a group, or individual feedback to each student: this could be an easier option than trying to use the written word, which can sometimes be misunderstood because of the lack of additional cues that come with a person's voice, which for example would clarify the extent to which a tutor is being critical or positive about the work.

Study support literature describes how organisation can be difficult for younger distance students who have had structured timetabling at school, and for mature students who have not had to meet such deadlines before. On the basis of comments from study experts during the interviews, and from student responses in the tutor and mobile learning study and during the OU texting study described in Appendix 15, I am sure that texting could help improve a student's organisational and time management skills, showing them how to keep to set dates and learn how to plan their studies. Alerts could be based on the course schedule and the key points in the student journey (later outlined in Table 5), and texts can be saved and reviewed when convenient. Jones and Edwards (2009) consider that students could become dependent on

the texts being provided by the institution or tutor, but they judge that the benefits of texts are sufficient to continue and suggest that more choice in frequency and type would help students learn to organise themselves. I believe that the scaffolding techniques already used elsewhere in learning would be helpful: new students could start with regularly-scheduled texts that could be lessened in frequency during the course, so that students do not become dependent on the texts being provided but instead learn to be self-reliant. Additionally, students could be taught how to use mobile tools themselves to set up their own alerts, to-do lists and other organisational systems.

The tutors and mobile learning study showed that materials do not always have to be expensively or professionally produced to be useful, interesting and engaging. I consider that Web 2.0 online tools have shown everyone that the materials that they develop themselves and share with others, perhaps through video sites such as YouTube or by commenting in public forums, have an immediacy and engaging value to them that is very different from professionally produced film or writing in a published magazine, but can be important in other ways. This freedom to create resources in a less 'professional' way can feed through into university resource provision and let educational institutions look at new ways to communicate with their students. As an example, a hand-drawn sketch that takes a few moments to produce might not only illustrate a point clearly, but it could also encourage students to believe that they could produce one themselves, just because it is not perfect. Materials can be created fairly quickly once some models and

examples show what is possible, and developers' skills always improve with practice.

Further issues in the use of mobile technologies

Assuming that the devices are to be provided and owned by the student, I suggest that it would be useful for the institution to develop a minimum specification so that students can be sure that their device can access the types of learning and support that are available: the OU already has such a specification for the provision of computers. There must be some consideration of accessibility for those who do not have the funds to buy their own equipment, should mobile devices become an assumed or required item for students to possess.

I consider learning to be part of the socio-cultural system that is currently accepted in a particular society. Education provision evolves as new practices, skills and technologies are adopted, and incorporating technology into teaching is difficult at a time of extreme change: while institutions are identifying how to use them, many staff are struggling to understand how they work and what benefits they might provide. For example, we know that collaboration and co-authoring are valuable skills for learners, and we increasingly have educational examples of effective use with handheld devices, but it can still be difficult to identify how to apply these to one's own practice. Pilots and trials of tools and systems are useful in helping institutions to understand what works and what does not, but could be frustrating for students who for one course may use an effective tool which is

not offered for the subsequent courses that they study. I knew from the beginning of my research that it would be subject to great and fast change, but could not have foreseen how quickly m-learning would progress in such a short time, including the extent to which this is happening within the OU.

Web 2.0 online tools, accessible through handheld devices, are now being used extensively outside education: they provide (usually) free resources and tools and ways to interact with others with matching interests. Within education, blogs encourage reflection, wikis allow collaborative working, podcasts and vidcasts are in some ways equivalent to lectures, but with different aspects such as the ability to not only hear and/or see the broadcaster but also to replay and review material as desired. Students are offered institutional communication tools, but may prefer to work elsewhere on systems that they already know, or perhaps because these are separate from the institution, and also allow easy access even when studying stops. Distance students have always had the option to meet for mutual support outside tutorials, or to contact each other at any time. Institutions must now accept that it is not possible to dictate or restrict where individuals choose to spend their time online. In the US, free speech issues have arisen when schools have attempted to police what students do online, outside school: but as Armstrong and Franklin argue, these technologies are moving the boundaries that have held learning to places, institutional structures and times; they mix formal and informal learning; and allow increases in functionality, flexibility, access and communication (Armstrong and Franklin, 2008). Educational institutions would do well to decide what students should know about the positive and negative aspects of their use: rather than

attempting to restrict the use of online tools outside the institution, educators should teach students how to use those tools in responsible and appropriate ways, before students disseminate private information or post inappropriate public messages that can be read by absolutely anyone for an unknown length of time.

A range of additional communication options will suit some students, especially if they can set up RSS feeds that will bring information to them, but for others it may be too difficult to keep up with all these options: OU students use multiple media in their course materials, which some already find difficult. Additionally they have an online desktop and course website, together with options such as forums, wiki or blog; resources for support information and guidance; tutor-provided options; library web-based resources; email and notice-board messages through their personal page. Further support media such as texts, or student-initiated connection through Web 2.0 services, might offer students choice and control, but for some could become a burden and source of anxiety that proves to be the 'last straw', producing fragmented options with different tools, each requiring their own digital literacy skills.

Distance education institutions offer a complex array of student support services which, despite their quality and suitability, can cause confusion when students want to ask for particular types of help and cannot identify the best department, faculty or service to contact. The addition of alternative options for support need to be incorporated with what is already offered in ways that

ensure that students know exactly where to find everything they need for their study.

Using handheld technologies for student support

In the area of student support in particular, the 'student journey' of a distance learner can be shown within a number of stages. Table 5 shows the explanatory framework developed by the OU to summarise the different parts of the distance learner's journey and this framework underpins the institutional organisation of student support. In my discussion of Figure 8, later in this chapter, I will show how each of these journey stages could be facilitated by the employment of mobile technologies, for communicating with students and offering them a supportive environment together with learning opportunities.

Table 5: The Learner Support Framework 2008: The Open University

DECISION	1. Course choice enquiries
ORIENTATION	2. Proactive pre-course contact
PREPARATION	3. Learning skills development
STUDY	4. On-course support 5. Proactive support around first assignment 6. Residential schools 7. Proactive mid-course contact 8. Careers
REVISION	9. Examinations and end of course assessment
REFLECTION	10. Proactive post/between course contact

At the present time I would expect that those learners who are using Web 2.0 and mobile technologies must see a disconnect between the tools they use in

their everyday life, for communication, work or informal learning, and the tools offered by educational institutions such as the OU. If we accept that learning is social, where understanding is a social construction that is developed by interaction with others, then m-learning, with its ability to promote additional contact, encourage a bond with peers and provide opportunities for collaborative and shared activities, must be of benefit. This new type of learning that can be facilitated by using Web 2.0 tools has come to be known as 'learning 2.0' and can offer a

> "user-centric information infrastructure that emphasizes participation (eg creating, re-mixing) over presentation, that encourages focused conversation and short briefs ... and that facilitates innovative explorations, experimentation, and purposeful tinkerings that often form the basis of a situated understanding emerging from action, not passivity" (Brown and Adler, 2008).

In such an environment a learner quickly becomes an active part of communities of practice and is enabled to develop their knowledge through interaction.

In my research I have found that mobile learning technologies offer a variety of options that can be incorporated within the area of student support. For some purposes this can enable learning, for example by encouraging students to consider key points in their subject, review course material topics or find information that can help them enhance their skills. For other purposes it cannot be described as 'm-*learning*' but nonetheless offers useful ways to

keep students on track, help them to feel part of the study community or allow them to deal with administrative tasks with more ease.

Anderson et al. (2001) state that learning itself can be categorised into four types: factual, conceptual, procedural and metacognitive. Having studied a wide variety of m-learning examples through the literature and during my own research, it seems that although mobile options can support these four types they do not always offer direct learning experiences. They can give factual information that is then revised through exercises; show animations or video to illustrate concepts or procedures; prompt a student to consider their own study strategies and meta-learning; and support the review and practice of previous learning through other modes, for example by using questions or quizzes. In these different ways they can help to provide support to students. Anecdotally, in addition to the generally positive feedback received from students, tutors in the mobile learning study said that they could see that students had benefited in many cases. As an example of metacognitive skills, Interviewee B suggested that prompts (which could be sent by text) could encourage students to reflect on the way they learn.

A model of student support using handheld technologies

Based on my research I have developed a model of student support, shown in Figure 8. Each letter in the figure relates to a description, shown in the boxes that follow the diagram. These give one or more examples to illustrate the purpose and type of mobile technology that could be used (although many other options would of course be possible). I also describe how these and

similar examples of support through handheld technologies can cover the range of the Learner Support Framework (LSF) that was shown in Table 5, illustrating the fact that the entire breadth of student support, from enquiry onwards, could make use of handheld technologies. The relevant parts of the LSF are also noted in each box.

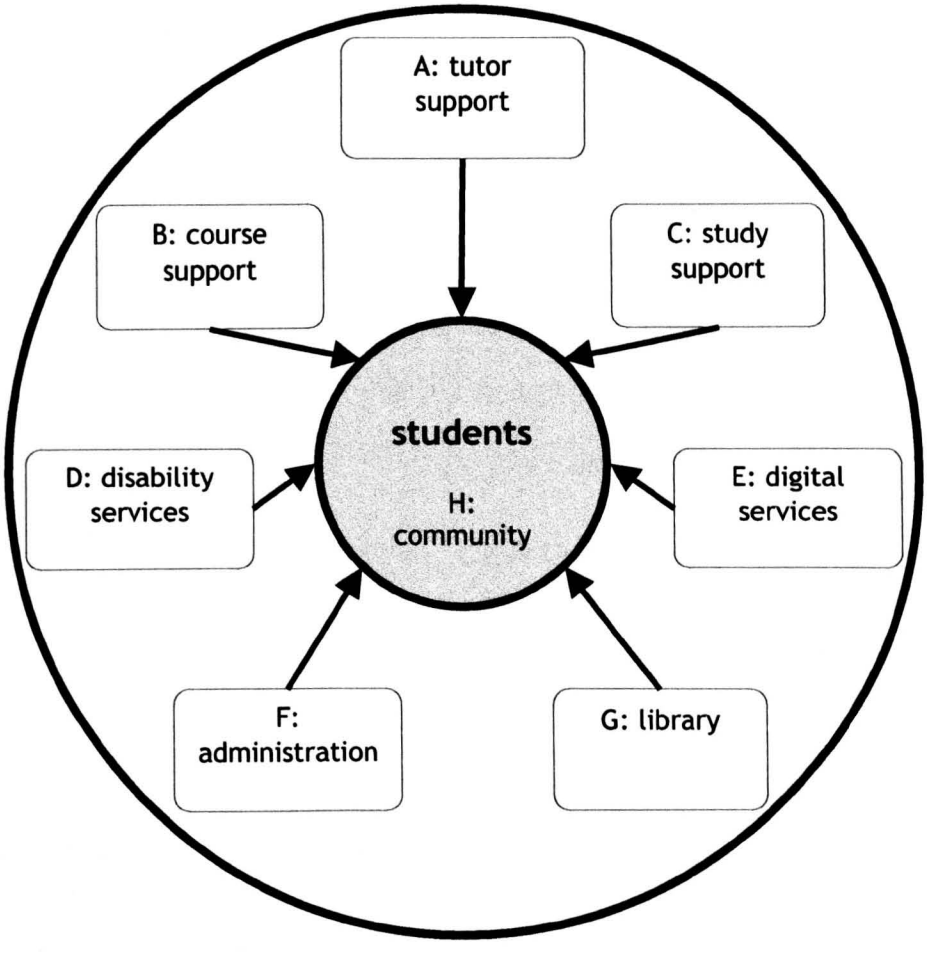


Figure 8: A model of student support for distance education, using handheld technologies

A - Tutor support

To engage with her students a tutor recorded a brief audio file and added it to the tutor forum (as an addition to her usual letter of welcome), encouraging students to attend tutorials and to contact her if they had any queries. The sound of the tutor's voice helps students to gain an idea of her personality.

To help students with a complex topic of the course, and particularly for those who could not attend tutorials, the tutor recorded a visual and audio description of the process, which allows students to see what they should do rather than read a complex text description.

Openings courses are designed as an access point for students beginning HE study. Computers are not used, and tutorial support is given through telephone. A tutor set up a wiki where students could share their written work with each other, and the students enjoy this additional contact.

LSF: proactive pre-course contact, learning skills development, on-course support, proactive support around first assignment, proactive mid-course contact

B - Course support

The course team developed SMS text messages, based on the course timetable, to help their students keep to the schedule and to encourage them to make better use of course resources. These prompt students about up-coming dates for assignments, day schools and the need for further

registration, and remind them of the optional resources that can help their study.

LSF: on-course support, residential schools, proactive mid-course contact

C - Study support

It is common for students to become anxious about exams, and distance learners (who have often been away from study for a long time) can find them particularly stressful. An audio file answers common queries about exams and revision, and includes practical advice to help students cope. Another audio takes students through a relaxation exercise to minimize their stress. These are available for download to any mp3 player.

Students studying subjects such as psychology may need to understand aspects of statistics: a downloadable file for mobile phones enables collection of data, practice exercises and development of charts from data.

LSF: proactive pre-course contact, learning skills development, on-course support, careers, examinations and end of course assessment, proactive post/between course support

D - Disability services

Students with disabilities have a variety of study needs. Those who are blind and visually impaired can download audio files that describe the services available to them, or that give them tips to help them to study effectively.

LSF: proactive pre-course contact, on-course support, residential schools, examinations and end of course assessment

E - Digital services

The institution's website has a mobile-accessible option. Additional resources are offered on iTunes U, specifically designed for mp3 use.

The OU website offers Browsealoud, downloadable software that reads web pages without the need for additional text-to-speech software. The audio can be saved as mp3 files and played at a later time.

LSF: course choice enquiries, on-course support

F - Administration

Communication with students increasingly takes place through messages by email or directly online in their personal area, both accessible by mobiles.

LSF: course choice enquiries, proactive post/between course contact

G - Library

A module to explain the use of finding and evaluating online information is available in a mobile-accessible format.

LSF: learning skills development, on-course support

H - Community

RSS feeds are available, for example to alert users to updates for the online student magazine, Platform

Areas on Facebook encourage students to become part of the wider student community and share information with each other.

Twitter areas provide a place for students to interact and exchange ideas and advice.

Student forums are part of mainstream course provision, including social areas where students discuss both academic and informal areas of interest. Induction forums are set up for newly registered students, where staff answer their questions and they can make contact with other students.

Student forums are set up for students with disabilities and additional requirements, to cover relevant topics such as Disabled Student Allowances and the use of equipment that can help their study.

LSF: proactive pre-course contact, on-course support, examinations and end of course assessment

I believe that this model could be used in part or in whole by an educational institution looking for ways to provide student support through the use of handheld technologies. It can be adapted to suit the different types of educational provision and the organisational structure of the institution, the faculties and subjects the students are studying, and the ability and expertise

of the staff. The model has the additional benefit that it can be established piece by piece until mobile support becomes incorporated in the institution in a way that suits the institution and its students. Initially it can be implemented through the two main methods that students themselves use, that is through texts or access through the mobile web, and using formats such as audio that are not restricted to particular models or types of device.

The model illustrates options for student support in practice. In Chapter 7 I discuss the conclusions that I reached as a result of this research and show how theories can be linked to the model.

Chapter 7: Research conclusions

In this chapter I consider the originality, relevance and limitations of this research, provide ideas for some further research that could follow from it, and give some personal reflections on the research and its process. Firstly I look at how my work has been informed by theories of learning and education.

Student support and educational theory

In Chapters 2 and 3 I reviewed a number of theories that were concerned with learning and student support. Having come to the end of my research work, it is time to reflect on the links between learning theory and the results of that research that have led to my suggestions for the practical implementation of student support through the use of mobile technologies.

The relationship between theory and practice from earlier approaches either (in the engineering model) proposed solutions to solve problems using factual or scientific research, or (in the enlightenment model) suggested that the ideas that arose from research should be used as a resource, and that practitioners could decide whether or not they were relevant to their particular situation. Action research tends to encourage the development of theories that arise as a result of the research that is undertaken, similar to the use of grounded theory, and my own ideas resulting from the research were covered in Chapter 6.

I refer here to some of the theories and approaches of adult learning, and how

they are supported by different options in the use of mobiles for student support.

Holmberg's 'didactic conversation' (1995) describes the relationship between the tutor and student in distance learning, and can be directly supported by the tutor through different communication methods. Keller's ARCS model of attention, relevance, confidence and satisfaction can be supported by mobile options: audio, review materials and texts were all shown to gain students attention during the research, and multimedia resources are likely to add extra appeal. Design of the materials must ensure relevance, preferably aided by allowing students to choose from different options, and the success of the learning should lead to satisfaction and increased confidence. Boud's stages of learning towards student autonomy could be encouraged through a scaffolding approach, offering more help as students begin, encouraging them to learn ways of self-direction in their learning and taking on the perspective of other learners through discussion and communication. The help could be given through all areas of the model. Learning how to learn was a recurring theme in the interviews and from authors in the review of literature. Students could be helped with this aspect by being directed to resources, sent prompts to encourage self-reflection, and drawn into communications with others about ways to improve their understanding of the learning process.

In terms of m-learning, Kukulska-Hulme (2005) explains that it can support various types of learning: for example, reinforcement suits behaviourist activity; immersive experience allows constructivist learning by discovery; work in context is for situated activity with social participation;

communication and sharing enable collaborative learning; everyday use works for informal and lifelong learning; monitoring and checking suit support purposes. For example, the reinforcement and review of learning by handheld technologies can use learning objects and quizzes. Constructivist learning depends on construction of knowledge through learner experience and through communication with others, which can be facilitated through mobiles (which are primarily communication tools). Collaborative learning can be enabled through the various communication options of forums, texting and social networks, even when the messages tend to be of short duration. Learning in the workplace and on field trips supports learning within a context or situation where the use of mobiles gives real value through easy access to resources and expertise and the ability to record and share information with others.

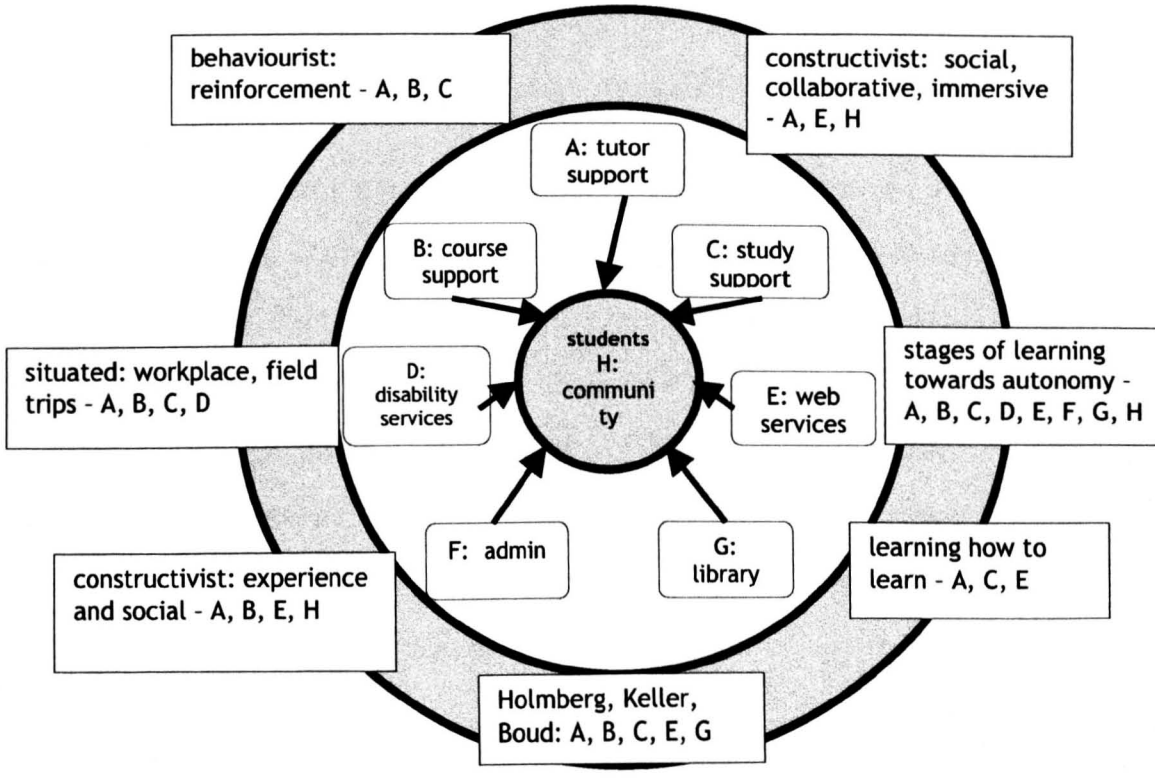


Figure 9: A model of student support for distance education, theoretical links

Figure 9 shows how these theories and approaches to learning can be supported by areas of the model of student support that was developed and shown in Chapter 6.

Originality of the research

This research has investigated the use of mobile learning and other options through handheld technologies as a means of providing student support, which is an aspect of m-learning that is under-represented in the literature to date. It has provided insights into the production of mobile-accessible materials by tutors without technical skills, and has identified the need for staff development and technical support and development of digital literacy skills.

The research suggests that a lack of knowledge or understanding of the uses of mobile technologies could have been a reason why some students in the study did not make use of them, but those who did access them generally found them beneficial for a number of reasons. The main driver that encourages students to use mobile access must be the flexibility that it allows them in deciding when and where to do their learning, although an additional benefit was the feeling of inclusion with parts of the educational community and some resulting signs of positive affective attitudes.

In Chapter 6 I presented a model showing different options for using handheld technologies that different parts of an institution could incorporate as ways to

help to support students, and of course other departments and individual staff members could use similar or alternative methods. The model's options could also encourage students to contact and support each other, with the result that they should become more integrated into the learning community.

Limitations of the research

This research has been conducted within a particular context of one distance education provider in the UK, and at a certain time in the development and use of handheld technologies. This institution has its own structure, ways of working and political pressures, and this could perhaps limit the generalisability of the results to other institutions.

Face-to-face interviews or focus groups with students with differing views of mobile learning would doubtless have produced fruitful data, but in the context of the type of research I chose to undertake within distance education and the amount of time that would be involved, this was not possible. Consequently, these are voices that have not been heard in this study. As mentioned in Chapter 5, eliciting further feedback from students in the tutors and mobile learning study would also have been helpful.

Although some attempt was made to include a broad range of participants in terms of diversity, both for the student questionnaire and in choosing the tutors, there were limits because not all subjects or faculties were covered, and because demographic details of participants (such as the age, previous education, experience of handheld technologies) were not collected it has not

been possible to consider any effects these might have on the results. Because the students included in the tutors and mobile learning study were not chosen at all, as they just happened to be included because of their tutor's involvement, no personal or demographic data was collected.

The senior experts in student support had interesting ideas about student support and prompted my own thinking about the ways that mobiles could be used, but it might also have been useful to hear from other experts who were less open to using newer technologies.

Relevance of the research for distance education

The distance education institution in which the research took place is particularly large and has no entry requirements for its circa 180,000 students, which means that their previous educational experience can range from no qualifications at all to postgraduate degrees and the student support that they need varies considerably. The tutors work part-time for the university and have a similarly wide range of abilities in the two areas, of student support and handheld technologies, that have been the focus of my research. Based on these facts it can be argued that the results of the main study, which was based on the work of a fairly representative group of such tutors and their students, is to some degree applicable to other distance education institutions and their tutors and students, despite the limitations mentioned above. The use of multiple methods of data collection (through questionnaires, reports, interviews, knowledge of other institutional developments in the field, access

to institutional documents and review of the literature) has allowed triangulation to support the validity and reliability of the results.

Suggestions for further research

There are obviously limits to the amount of research that can be undertaken by one researcher in a programme such as this, and consequently I have not been able to pursue any research ideas that have emerged. The study has pointed up a number of further directions for research into this area, and I outline a few of these in this section.

Student responses in the tutors and mobile learning study showed that they felt an increased sense of personal contact with the tutor, and some with the institution, and perhaps these feelings could help to retain students to the end of their course. What particular aspects of mobile materials or services would best encourage this feeling of inclusion in a community? Can similar affective aspects be identified and linked with the use of mobile support options?

If students feel part of the community this could affect the way they feel about their studies. Would 'opt in' mobile contact options improve the rate of retention for some students and can these options become part of the proactive support that is already in place? Could this social dimension be considered as part of a strategy for widening participation?

The senior experts I interviewed stated that the most effective learners were those who had developed meta-learning skills and understood the most useful ways of studying for specific purposes. It would be useful to develop this

aspect of 'learning how to learn' through the use of handheld technologies: students are not always keen to spend time on this type of exercise and it would be helpful to find more engaging ways to develop these skills. Could mobile resources be designed that encourage students to develop their knowledge about their own learning strategies?

Is the planning and delivery of suitable support options too time or resource costly for the developers, or can templates, best practice and VLE tools make this type of option sufficiently simple and quick?

The institution is working to the assumption that mobile learning options are beneficial and should be offered to students. To what extent are students already accessing (or trying to access) the institution's resources through mobiles, and are there any barriers (such as usability of the interface design or lack of interest) that stop them from doing so?

Students may not understand that they need to be able to evaluate the reliability of the sources from which they access information, and the implications of sharing personal details on social networks. What additional skills do students need in order to cope with these new technologies that allow anyone to find information about anything or any individual? How can these skills best be developed?

Ofcom have reported (2009) that less than 50% of people are using their mobiles for more advanced functions. If these functions are to be designed into courses or student support provision, what types of resources or training

will be needed in order to encourage students to use them with sufficient understanding?

Distance education providers need to educate and engage with young as well as mature students. Is there sufficient evidence to support the claim that digital natives are so distinctly different (in both their technology skills and their learning preferences) from previous students that fundamental changes should be made to the provision of education, or can this distinction be ignored?

Personal reflections on the research

As mentioned in Chapter 1, I have direct experience of being a distance learner and know about the self-motivation and persistence required during the currents of domestic and work distractions or study frustrations and setbacks. However, the research work involved in this doctorate has needed a level of commitment and involvement that I had not previously undertaken, and for a far greater length of time. I have been able to persevere during difficult times, and discovered how fascinating it can be to develop one's ideas and become immersed in an investigation that allows further discovery through research design and practice. As I had expected in my choice of an AR approach, my initial plans for the research were amended as I continued to read the literature and undertook the initial study, and I extended the focus of the work so that I could investigate wider aspects of student support within distance education. The AR process and the way that it encourages

practitioners to evaluate their research and amend their next steps has suited this study and I have been able to focus on emerging ideas.

When I reviewed the details of the tutors and mobile study I realised how many people it had involved in the process: 14 tutors, their line managers and the chairs of the courses for which they taught; up to 500 students for whom the tutors were responsible; and several other central staff who either had responsibility for tutor development or for resource provision for tutors and students. The research has helped me to look in a new way at the relationships between distance students and the institution through which they learn and of which they are members. I now have a far greater appreciation of the community in which I work, of the complexity of the support offered by my own institution and of the commitment of the variety of staff working to provide support to learners and encourage them to make the most of their study opportunities, and who deal with the problems of individual distance students. Having seen the results of the work done by the group of tutors I realise the amount of effort that they were willing to expend to work with their students. I was pleased to find that they also gained from the experience of their action research in terms of their own practice and understanding, and additionally had found strength in group collaboration and the sharing of knowledge. Their learning journeys and mine ran in parallel.

Using an AR approach suited the way that I work day-to-day (which is within a multi-disciplinary and democratic team) and my interest in people's psychology and social interactions. My research design included access to the tutors' reflection on their work and was a way to widen the scope of the work

within my personal time limitations. At the same time that I was following my own interests and development I could address those of students, my colleagues and distance education institutions at a wider level. The combination of reflection with action that could result in what Reason and Bradbury called "practical solutions to issues of pressing concern to people" (Reason and Bradbury, 2001 p.2) was appealing, particularly as it allowed me to develop and refine my research as the work progressed. Figure 10 shows the overall research process for this research and how the research approaches fed into it. As I gathered and evaluated the data and discovered emerging ideas from the evidence, my decisions moved my research into slightly different areas. The literature review and developments within the institution provided me with further concepts and understanding.

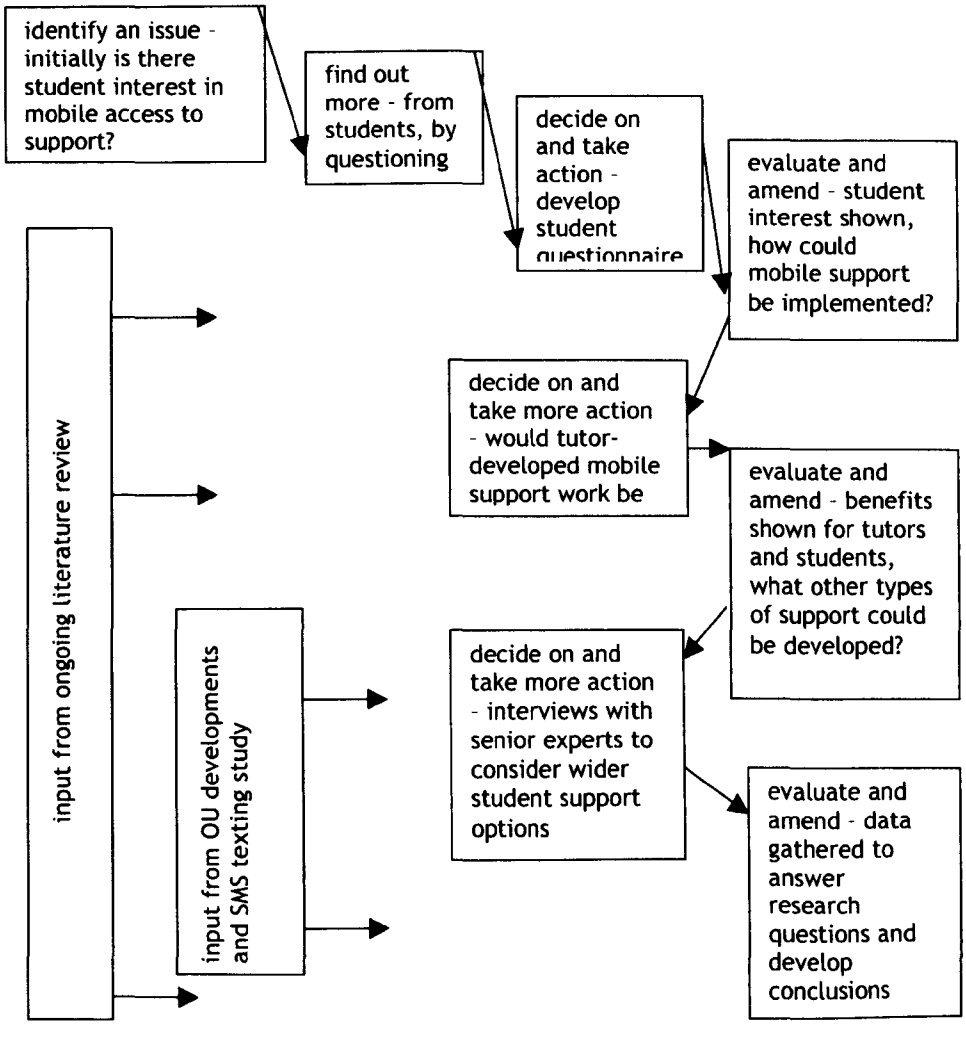


Figure 10: The overall research cycle

Mobile learning is part of the social and cultural change and context, and creates a social pressure on educational institutions. It provides ways to link to distance students beyond tutorials and online sites, and offers an option that can be added to the learning blend. It can fill a gap in the institutional communication strategy and help to keep in touch with distance learners, and add media-rich learning objects that students can replay and review to support their learning and their wider organisational needs.

Phillips and Kelly describe themselves as "skeptical enthusiasts" (Phillips and Kelly 2000, p.19) about the use of technologies, and that is a description to which I can relate. I do not consider technology to be something that will answer all our educational problems, but do believe that for certain purposes it offers some very strong benefits and interesting alternatives.

There has been a lot of excitement about m-learning over the past few years: it seemed that mobile learning could provide almost anything. There were plenty of papers, reports and articles about the possibilities, and schools seemed to use them in a variety of ways quite early in m-learning's development: both primary and secondary schools are doing some innovative and interesting work. However, it was difficult at first to find real and practical examples of mobile learning in HE institutions, except for some particular situations such as work-based learning and for field trips that both offer more obvious benefits. Every new medium that has come to be used in HE distance education, from print, radio, TV, video, CD and DVD, has

engendered similar enthusiasm and then it takes some time for educators to understand how to develop the potential. Eventually each new term, like 'e-learning', becomes absorbed into the word 'learning', no matter what the medium of access. M-learning is likely to become one of several elements in blended learning and in student support, embraced by distance education in the same way as previous media when they each offered particular benefits. M-learning will hopefully become an invisible technology and students will simply concentrate on the learning or the support that they gain.

Distance learners have always used their commuting time, places of work and other areas in which to study, and doubtless campus-based students do the same. M-learning is more than just studying elsewhere: people may be actively 'on the move' while accessing information and material, and the infrastructure allows handheld and mobile devices to be readily usable almost anywhere whenever the interest or opportunity arises. This 'movement' can be across time, space and contexts, and incorporates informal learning that is chosen and undertaken by the user. Sharples initially defines m-learning as "the processes of coming to know through conversations across multiple contexts amongst people and personal interactive technologies" (Sharples et al., 2005 p.4). I agree that mobile is not just about location: a wireless-connected handheld device allows ready access to sources of reference, to study material, to communities of peers and experts, to organisational tools, to new ways of recording thoughts and ideas, to e-books, and not only changes the way that people study, work and interact but also the way they want and expect to do so in the future.

There are still barriers to m-learning, some of which are described in Chapter 7: as yet there are few standards in producing handheld devices, but the use of the mobile web provides a way to offer resources and services that can be accessed by as many devices as possible.

This research has been undertaken in terms of an action research study of mobile learning developments in the context of the OU. Its importance to me as a subject was primarily due to my own practice in developing information, advice and guidance materials for OU students of all levels, and secondly to my interest in the global technological developments taking place that seemed to be becoming a part of our way of life. I have brought together a review of some of the relevant literature, an analysis of the studies that I have developed and evaluated, and an outline of other developments that have taken place. This information has illustrated some ways that mobile learning has been used not only as a way for students to learn but, for the specific aims of this research, how they have a role in supporting distance students while they study and encouraging them to continue with their learning.

Modern distance education uses technology, and the global growth of handheld devices cannot be ignored. Using the means of mobile communication that students already possess is a practical answer for distance education providers. Mobile phones in particular allow learners to access information and material wherever they are, and already offer a wide variety of features and media options to which other features will (no doubt) soon be added. People in isolated areas, those unable to attend even an occasional

day school, or those who cannot afford a landline phone or a PDA, may well own a mobile phone because it can be less expensive overall, even with ongoing costs.

Handheld technologies offer an addition to blended learning options to suit a particular learning need. Support becomes flexible in time, place and type of media and may help in widening the participation of those not currently in HE (Phipps and Kelly, 2006). Resources should be tailored for individuals, with needs as the main criteria: "the only way to judge accessibility of e-learning within an institution is to assess it holistically and not to judge it by a single method of delivery" (Phipps and Kelly 2006). Additionally, handheld devices restore the flexibility of study place, and thus time, that have always been distinctive features of distance learning as students become less reliant on computers.

Society changed when personal computers were adopted in homes from 1985; now people are eagerly adopting mobile technologies. If people already have experience of new technologies when they begin to study, they will accept and even expect that these could be used as part of their study media. Mobile equipment is considerably cheaper than computers, particularly for low-level models like mp3 players or phones that receive SMS. Apart from supporting students, new technologies also allow practitioners to share their knowledge (Beetham, 2004).

While 'independent', 'autonomous' or 'self-directed' learning is an aim in HE, O'Doherty (2005) explains how these terms are often badly defined and need clarification to describe what is in effect a student's ability to take control of

their own learning together with the support of a variety of other people within the HEI. If any new methods or technologies can help students become such self-directed learners then it is important to investigate and implement them. Evidence from tutors and students during this research has upheld the hypothesis that mobile learning can offer a valuable option for reaching and supporting learners.

My research has shown that mobile and handheld devices could be used for student support in a number of ways that would help the distance learner:

- as a method of communication between tutors or other staff and students, particularly using voice audio and texting
- to personalise a student's support within the context of their chosen course
- for group cohesion with study groups or other learning communities
- to prompt participation in ongoing forums or other discussions
- to introduce and suggest new material, news or events
- for revision and review of learned material
- as reminders of what actions, tasks or options are due
- to introduce and support meta-cognitive aspects of learning how to learn
- to positively reinforce a student's perception of their learning progress.

It may be that in time mobile learning will be identified as the fifth generation of media for open and distance education, but perhaps this is something that can only be decided in hindsight.

Dissemination

I have taken various opportunities to disseminate information from my research informally through various relevant OU groups, on the OU's internal publishing area and through internal and external conferences. A list of formal dissemination routes is shown as Appendix 18.

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Reference list of appendices

Appendix 1: Study skills resources questionnaire

Participant number	1 2 3 4 5 6 7 8
Do you use any of these?	MP3 player mobile phone that can access the web texting handheld computer

We are considering adding more interactivity on our study skills websites. Which of the following would you be likely to use?

Type - and example of use	Yes	No	Comments
audio - instructions or discussion			
video - how others work, people talking about their study ideas			
software demonstrations - showing how to do something such as make a folder			
forum, conference, blog - discussion and tips			
web access using mobile phone			
podcast of regular new study tips			
wiki - shared documents where anyone can contribute			
online quiz, questions and feedback			
online activity using 'drag and drop' to choose answers			
diagnostic - finding out how much you already know about a topic			

Appendix 2: Study skills resources questionnaire - responses data and summary

Note that dashes have been entered where neither yes nor no were marked.
? was sometimes entered by the student as a response.

Type - and example of use	Participant number	Yes	No	Comments
audio - instructions or discussion	1		✔	happy to read, easy to skip text
	2	✔		instructions easier to follow
	3		✔	prefer to read instructions - no value in just having them read to you. Discussion would be of more use and interest to me.
	4	✔		helpful, would be more likely to use video though
	5	✔		eventline, tutor case studies
	6	-	-	
	7		✔	
	8		✔	
video - how others work, people talking about their study ideas	1	✔		engaging
	2		✔	quotations / few sentences about people's work/ experience are enough
	3	✔		I would consider this because it is learning from others' experience in a more face to face format.
	4	✔		
	5	✔		eventline
	6	✔		
	7	✔?		
	8		✔	because of bad quality
diagnostic - finding out how much you already know about a topic	1		✔	probably would be too quick and easy, otherwise discouraging
	2	✔		
	3	✔		if this told me which bits of a block I needed to focus on!
	4	✔		
	5		✔	
	6	✔		
	7	✔		
	8	✔		
software demonstrations - showing how to do something such as make a folder	1	✔		always helpful
	2	✔		easy to follow and learn online - step by step
	3		✔	demos on the PC tend to take too long to keep my interest
	4	✔		
	5		✔	may be of use for specific tasks eg budget software
	6		✔	wouldn't be of use

	7	✔		
	8		✔	
forum, conference, blog - discussion and tips	1	✔		but could take too much time
	2	✔		compare with other students
	3	?		if run by a tutor - not interested in 'ramblings' - want constructive use of time
	4	✔		would be very likely to use these
	5	✔		
	6		✔	
	7	✔		
	8	✔		
web access using mobile phone	1		✔	don't use
	2		✔	prefer studying browsing with computer - easier to interact
	3		✔	not interested in this form of technology - no use for it at present!
	4	✔		makes sense as all new phones have web access
	5		✔	
	6		✔	wouldn't be of use
	7		✔	
	8		✔	
podcast of regular new study tips	1	✔		might help pacing of course
	2		✔	
	3		✔	not interested in this form of technology - no use for it at present
	4		✔	some may find useful. I would rather a one-off podcast of tips
	5		✔	
	6	✔		
	7		✔	
	8		✔	
wiki - shared documents where anyone can contribute	1	✔		interesting to get other perspectives
	2		✔	may provide false or unreliable resources - better to get from one source
	3		✔	no idea what wiki is at present!
	4	✔		
	5	✔		
	6		✔	
	7		✔	
	8		✔	
online quiz, questions and feedback	1	✔		engaging
	2	✔		good revision style
	3	✔		if there was a shortcut to Q&As (not needing to go through each Q individually) - good use of time
	4		✔	
	5		✔	

	6		✔	no, similar to forum
	7		✔	
	8	-	-	similar to diagnostic
online activity using 'drag and drop' to choose answers	1	✔		engaging
	2	✔		good revision style
	3		✔	takes too long to retain my interest
	4	✔		would be a good, fast way of doing the activity
	5		✔	
	6	✔		for exams
	7	✔		
	8	✔		
text - reminders or news	1		✔	intrusive
	2	✔		good revision style
	3	?		yes - if course related, value-added info - no, if news
	4		✔	I'd rather email reminders. Text is still more of a personal thing for me.
	5	✔		
	6		✔	
	7		✔	
	8		✔	

Preferences list	Yes	No
audio	3	4
video	6	2
diagnostic	6	2
software demo	4	4
forum	6 +?	1
web access via mobile	1	7
podcast	2	6
wiki	3	5
quiz and questions	3	4
drag and drop	6	2
text	2 +?	5

Appendix 3: Tutors and mobile learning: application to Student Research Project Panel

THE OPEN UNIVERSITY
Student Research Project Panel

For Official Use

Application No _____
Date Received _____
Approved/Not approved _____

Application for Project Approval

(NB: Applicants are strongly advised to read the SRPP 'Guidelines for Applicants' before completing this form).

1. Applicant(s) or Principal Internal Research Contact

NAME(S)	UNIT (No acronyms)	POSITION
Jane Lunsford	Learning Design & Technology, Student Services	Lead Instructional Designer and Evaluation Coordinator

2. Research Personnel

Please give below the names of all other persons who will be associated with this project:

[names removed]	Head, AL Support, Student Services Head, Learning Design & Technology, Student Services Project Manager, AL Support, Student Services	
Tutors as listed: *[names removed]*	L120 Ouverture a fresh start in French E303 English grammar in context T175 Networked Living: exploring information and communication technologies Y154: Open to change M208: Pure mathematics SD226: Biological psychology: Exploring the brain SD329: Signals and perception: the science of the senses ED209: Child development EK310: Research with children and young people W200: Understanding law DD100: An introduction to the social sciences: understanding social change DD121: An introduction to the social sciences: understanding social change Part 1 D820: The challenge of the social sciences	*[regions removed]*

	W100: Rules, rights and justice: an introduction to law W300: Law: agreements, rights and responsibilities B120: An introduction to business studies K100: Understanding health and social care SK277: Human biology B202: Understanding business functions B120: An introduction to business studies SK226:Biological psychology: exploring the brain SK120: Diabetes care T175: Networked living: Exploring information and communication technologies M865: Project management U212: Childhood EK310: Research with children and young people E849: Leading and managing for effective education BZX713: Fundamentals of senior management	

3. Brief Title of the Proposed Project (no acronyms)

Tutors and mobile learning - action research

4. Duration of the Project

Start (Month/Year):	Finish (Month/Year):
February 2007	November 2007

PLEASE ENSURE YOU GIVE AN ESTIMATED DATE OF PROJECT COMPLETION

5. Is it intended to repeat the project (e.g. Annually)? If so, how often?

no

6. Brief Description of the Proposed Project

6.1 What are the aims of the proposed project and what methods will be employed (maximum 100 words)?

To investigate the use of mobile technologies and mobile devices as ways of communicating with students
to consider the scope of mobile learning for supporting pedagogical uses and

developing learning. Fifteen tutors will design materials in alternative media that can be accessed through mobile devices in order to work with their tutor groups.

The materials will not require students to spend additional study time.
Students will choose which type of materials they prefer to use. Tutors will evaluate use and educational value of the alternative media (by questionnaire) and whether such material could be provided by tutors as part of their work, eg how much time taken to produce and knowledge needed
Instructional resources will be developed for other tutors interested in producing such alternative materials

6.2 How does the project complement/overlap with projects previously carried out, in progress or in the planning stages?

Similar work by tutors is being undertaken by the PILS projects and the principal researcher will keep in contact with that work. Other evaluation in this area undertaken in the OU, including the use of mobile technologies by students (Kukulska-Hulme and Pettit), and evaluation of the work of students on TU120 (Beyond Google) will also be considered. LDT keeps in contact with the VLE mobile project through Rhodri Thomas. These and other OU research results about the topic area will be distributed to tutors taking part in the project.

6.3 When and to whom will the final report be circulated?

December 2007/January 2008.
Student Services Executive and Student Services Management Team
VLE Programme Board
Christina Lloyd, Director, Teaching and Learner Support, Student Services.
eLearning Strategy Group
The report will be disseminated to parties interested in the topic within the OU, including VLE team, Student Services personnel, ALs, participating students
Material developed as a result of the project may be shared with students.

7. Data Collection

7.1 What method will be used to collect information? (Please tick below as appropriate)

a) self completion questionnaires ✔
b) personal interviews ✔
c) group discussions ✔ [principal researcher with tutors]

d) other (please specify) ✔ - feedback from tutor participants through tutor forum
other methods not yet decided, although both quantitative and qualitative data will be sought.

7.2 **Please attach an outline of the questionnaire or any other data collection instrument to be used.** not yet decided - tutors will develop individual questionnaires with advice from principal researcher. Data collection instruments for use as a central research tool later in the project will depend on the data collected by tutors from their students.

7.3 What is the nature, size and location of the population to be studied? Please include course code/s if relevant and approximate number of those to be surveyed.

Each tutor will work with a group of their own students on the courses itemised above in (2) - final decisions have not yet been made as to which courses will be involved as Staff Tutor and course team approval must be sought.

7.4 How is the sample to be selected?

Tutors work with a complete tutor group - students decide whether or not to take part in the project.
If they choose not to take part in the project they can still choose whether or not to use the alternative materials.

7.5 How many times will the sample be involved in providing data?

Not yet finalised. Tutors will develop individual project plans describing how they will offer their students alternative materials and how they will collect data about the use of those materials

7.6 What enquiries have you made about the extent to which the sample has been or is currently involved in OU institutional research and what are the results of those enquiries?

Unknown: Each tutor will work with their own allocated students.

7.7 Do you intend to merge survey data with demographic and progress data held on the Student research database?
/NO
If yes, please list the variables required:

-

7.8 Will data on individuals be automatically recorded or processed (e.g. on a microcomputer, word processor or mainframe)?
YES/

If the answer is YES,

a) Where will the data be processed? by tutors, then centrally by Jane Lunsford in LDT office, either electronically on a password-protected computer or physically in a locked cupboard. All data will be anonymised.
b) How long will the data be held? up to three years

7.9 Data Protection

The processing of personal data is governed by the Data Protection Act and all staff should comply with the University's Data Protection Code of Practice. Personal data held for research purposes

- Must not be processed to support measures or decisions relating to particular individuals and
- Must not be processed in such a way that substantial damage or distress is caused to individuals.

Data Protection Questionnaires

Applicants should complete a questionnaire (sent with the application form) and return it to the Secretary of the Student Research Project Panel with their SRPP application. (The Secretary will forward the Data Protection Questionnaire to the University's Data Protection Co-ordinator).

8. Implications of the Proposed Project

8.1 If the study involves the use of student samples, have you consulted the Head of the Student Research Centre in IET concerning resource for

drawing samples and processing questionnaires if required?
N/A

8.2 If the study involves the use of self completion questionnaires, have you consulted the Survey Research Centre in IET on the design of questionnaires? NO

8.3 Have you either ensured that you have sufficient facilities to process the data yourself or checked that IET has the capacity to process it for you?
YES

8.4 If the study involves a region or study centre, have you discussed this aspect with Student Services (Planning)?
NOT APPLICABLE

8.5 If the study is to be carried out at a residential school, have you consulted the Residential Schools Office? NOT APPLICABLE

Signed:_____ Print Name: JANE LUNSFORD

Contact Address and/or e-mail address: v.j.lunsford@open.ac.uk

Date: 13th February 2007

A list of projects which have received approval from the panel is being compiled, giving the name of the project proposer(s), their department, the name of the project and brief details about it. This will be generally available with the aim of avoiding duplication of work and alerting researchers to others with similar interests. This list may also be published in internal Open University publications.

Appendix 4: Tutors and mobile learning: call for volunteers

Subject: Tutors needed for a project about mobile learning

Dear colleague

Why we've contacted you
We're writing to you as you have previously expressed your interest in being involved in additional work with The Open University. If this is no longer the case, please let me know and we will remove your name from our list.

About the project
The Open University is about to begin an action research project in mobile learning, and we are looking for associate lecturers who would be interested in taking part.

The project purpose is to investigate the use of media that students can access via mobile devices (and by computer) and that can enhance their learning. One option is the use of audio/podcasts as a way of offering your student group course-related and general support. Another option is the development of interactive quizzes or crosswords that students could use to review what they have learnt.

We would like tutors to decide exactly how they could use these options in their work, but the project team will offer 'how to' information, advice and resources, and help tutors in the development of their individual projects. Some possible examples are suggested below, but you probably have your own ideas.

This is a research project in which we will attempt to evaluate the usefulness of such material. From the findings of the project we could develop resource material to help other tutors who are interested in working in this way.

Issues
- Your students will be invited to 'opt in' to take part in this project, so the work would be in addition to your normal tutoring responsibilities.
- The alternative media should not increase the student workload to any extent; the material should be regarded as offered in an alternative medium rather than as additional.
- Accessibility: those who do not use the audio or interactive options should be provided with print or electronic text.
- Your Staff Tutor will be asked to approve your participation in the project.
- The cost of any additional equipment required for the projects will be borne by the OU.

Some possible examples

1. If you send out a printed plan before a tutorial to let students know what you will cover, you could record this as an audio file. You might discover which method your students prefer and why: perhaps new students like to hear your voice and find it encourages them to attend; perhaps they would rather have text because it suits their style or way of working.
2. If you send out a text summary of what was covered in a tutorial, would students prefer an audio summary so they have the option to listen to it on an MP3 player?
3. If you add your notes to an article and send it to students to illustrate points in the course, would it be easier to explain in an audio file, where you read out the article and pause to explain how this fits with the course themes?
4. Could you develop a crossword or quiz (we'll provide the easy-to-use software) to help your students review a topic or theme in the course?

Who can take part?

We are looking for five associate lecturers who are tutoring on a range of courses, to give us as broad a scope as possible for our investigations. We do not have any requirements on your current experience with technology. You need to be able to do all the following.

- Reply by Monday 29 January to let us know your interest in attending the first meeting – we would confirm an invitation by Wednesday 31 January
- Attend the introductory and planning meeting at Walton Hall on Tuesday 6 February
- Decide whether or not you will take part in the project after attending the meeting
- Commit up to 12 days' further work – 10 days for running the project and 2 days for evaluation; the current day rate for AL contracts is £107.36
- Invite students in your group to take part in the project
- Develop and produce material to use with your students
- Report regularly on your individual project
- Take part in an online forum to share progress and advice
- Attend a summary meeting at the end of the pilot

Interested?

If you are interested in participating, please could you e-mail me as soon as possible with the following information:

- A confirmation that you attend the 6 February meeting at Walton Hall
- The courses you are currently tutoring
- The course presentation dates
- An idea of your knowledge of audio use – let me know which of these best matches your skills
    a) I'm a complete beginner

b) I've listened to podcasts
c) I've recorded some audio

If you aren't sure
If you would like to find out more about the project before expressing your interest, I would be happy to talk to you – please call me on 01908 xxxxxx, where I can be reached from Tuesday 23 January.

Appendix 5: Tutors and mobile learning: sample tutor plan, Tutor 4

Timetable and materials to be developed

February - early March 2007 (already done)

Introduce project to students. *Tutorial 1st March and subsequent emails*
Plan specific areas of the course for which mobile learning resources might be helpful.
Explore available software eg wink, crossword creator, blogging software.
Create initial commentated video of cell counting on the digital microscope.
Create initial audio file

Number of project days - 2 days (confirmed)

March 2007

Explain project further to students and collate consent forms.
Continue to use blog to provide information and answers to questions
If possible create commentated video on how to use eTMA system.
Send out hard copy consent forms to anyone who has not returned one already.

Number of project days - up to 2 days (estimated)

April 2007

Obtain microphone and relevant software to create podcasts.
Continue to use blog to provide information and answers to questions
Create podcast with verbal summary of TMA01 results and points to look out for for future TMAs

Number of project days up to 1.5 days (estimated)

May 2007

Continue to use blog to provide information and answers to questions
Create commentated video on how to use excel to create simple graphs (relevant to experiment write up in TMA02)
Create podcast on hints and tips for TMA02

Number of project days up to 1.5 days (estimated)

NB 10 day holiday may reduce amount of time available this month

June 2007

Create podcast with verbal summary of TMA02 results and points to look out for in future TMAs
Continue to use blog to provide information and answers to questions
Create podcast with hints and tips on approaching TMA03

Number of project days up to 1.5 days (estimated)

July 2007

Continue to use blog to provide information and answers to questions
Create podcast with verbal summary of TMA03 results and points to look out for in future TMAs

Number of project days up to 1.5 days (estimated)

August 2007

Continue to use blog to provide information and answers to questions
Create podcast with hints and tips on approaching TMA04

Number of project days up to 1 day (estimated)

September 2007

Continue to use blog to provide information and answers to questions
Create podcast with verbal summary of TMA04 results.
Create podcast with hints and tips on approaching ECA

Number of project days up to 1 day (estimated)

Ensuring accessibility
The blog has been created on a freely accessible internet site *[URL]* therefore anyone can look at it who has access to the internet. Comments need to be moderated by myself.
The resources eg video / podcasts are currently being placed into the tutor group conference as I have nowhere else to put them. Unless somewhere else comes up I may use some personal webspace so that students can access the material without needing to access the OU studenthome site, a problem for some students.
I have emailed resources to some students but the size can cause problems. If all else fails I can put the information onto a CD and send a copy to the student through the post.
Information does require internet access but I have reasoned that this is a mobile learning project and students will need internet access to access information.
Information can then be copied to whichever format a student wishes and used on other devices if necessary.
Other accessibility issues have yet to be thought through.

Appendix 6: Tutors and mobile learning: draft message to inform students about the research study

- *Message regarding the project, plus consent form to be completed by all students unless they have already asked not to be approached about any research (which would be logged in their central record).*
- *You'll want to use your own words and fill in the part in brackets to suit your own work as well as give a title on the consent form. However we suggest you tell them something like this to give students the gist of the project without worrying them that they may*
  - *be pressured to take part*
  - *have extra work to do*
  - *feel part of an experiment.*
- *The consent form can be offered at a tutorial, sent and returned by e-mail, or you may need to provide a stamped addressed envelope for its return by anyone not using e-mail.*

Introduction of the project to students within a tutor group

As you take courses through the OU you'll find that individual courses and tutors support their students in slightly different ways.

I will be sending you information to help you throughout the course, and you will sometimes have the option to get that information either in text or alternatively by *[audio or other methods].* It is up to you which options you choose, and you may want to try which method suits you best. The different methods are alternatives, and you don't need to use both unless you'd prefer to and find them useful.

I'm interested to discover which of the options you prefer, if any. However, any research of this kind in the OU has to have permission from the students involved, so I'd be grateful if you would complete this form and keep a copy of it. Consenting to taking part means that I will be able to record and gather information about your use of the alternative materials, and that will help me to provide material and information in ways that students like. Although I would then be able to record your preferences and share that information with other tutors, any responses will be made anonymous.

If you choose to take part at the beginning of the project and change your mind later, you can then withdraw by contacting me or the OU staff member who is coordinating this project overall (see below).

As you can see from the consent form, it's entirely up to you whether or not you take part in this project. Please don't feel that you have to take part if you'd rather not. You will still be able to use the alternative materials if you choose to.

I am happy to talk with you individually about this. Alternatively, if you have any questions or concerns and would like to contact another member of staff at any stage in the project, please e-mail v.j.lunsford@open.ac.uk.

Appendix 7: Tutors and mobile learning: consent form for student participation

Title of Project: [....]

Please indicate your willingness or otherwise to take part in this project by ticking the appropriate box and completing the details below. At any time during the research you will be free to withdraw, and your participation or non participation will not affect your access to tutorial support or the results of your assessments.

The results of any research project involving Open University students constitute personal data under the Data Protection Act. They will be kept secure and not released to any third party. All data will be destroyed once the project is complete.

☐ I am willing to take part in this research, and I give my permission for the data collected to be used anonymously in any written reports, presentations and inclusion in published papers relating to this study. My written consent will be sought separately if I am to be identified in any of the above.

☐ I am willing to take part in this research. However, I **do not** give my permission for any data (either words or images) to be collected as a result of my participation.

☐ I am **not** willing to take part in this research.

Name: .....
please print

Student PI: .....

Contact details: address .....

e-mail .....

phone .....

Signed: .....

Date: .....

If you have any questions or concerns and would like to contact a member of OU staff at any stage in the project, please e-mail v.j.lunsford@open.ac.uk.

Appendix 8: Tutors and mobile learning: preliminary questionnaire to students - sample, Student 13

Have you accessed any of the mobile learning resources provided by me?
Yes

Which of the following mobile learning resources have you accessed / used (if any)?
Other (please specify)
C fos video
TMA01 review podcast(s)
TMA02 tips podcast(s)
TMA02 review podcast(s)

Other podcast(s) (please specify)
Comment: tma 03 tips

Please briefly describe how you used the resource and how it helped.
I have used the tma's tips podcasts before completing each tma for guidance and the review for each tma after receiving a tma back to see where I've gone wong.

Please describe any problems you experienced accessing the resource
None.

Please describe any further resources that you would like me to develop
I wouldn't mind a similar type of podcast for things covered in tutorials, that might not be part of the tma, but are important to the course.

Would you recommend the use of any of the resources to other students on [course code]? Please explain your answer
Yes
Comment: Yes, I think its a brilliant idea, especially if you are not able to go to tutorials as it makes 'me' feel part of the course. I wish my other course had this. I have also played the podcasts to a friend, who is studying with the OU, but not this course and she too thought it was a really good way for enhancing the course.

Appendix 9: Tutors and mobile learning: final questionnaire to students - sample, Student 3

Thank you for agreeing to take part in the mobile learning project for me during this year's [course] June course presentation. I hope that you have found the resources that I have provided were helpful in your study of the course. I would now like to ask a number of questions about the resources themselves, as well as your experiences using them. The results will form part of a report that will be submitted to the university and will hopefully be used to inform future provisions and recommendations for students.

If there are any questions then please do let me know.

Name [...]

Please tick which of the following types of resources you accessed:

1. Tutor group Wiki for [course] ✓
2. Interactive crossword puzzles, e.g. Making Sense of Poetry ✓
3. Audio files e.g. Preparing for the [course] ECA; more quick tips on preparing for your ECA ✓
4. Word documents e.g. Japanese poetry and English; writing references. ✓
5. Links to other online materials, e.g. articles

Online crosswords/puzzles:
Please complete the following series of questions if you accessed the crosswords or puzzles at all.

6. Which of these crosswords or puzzles did you use?
   Part 2 - Poetry puzzle ✓
   Part 3 - History puzzle ✓
   Part 4 - Art History Puzzle ✓

7. Were the crosswords and puzzles easy to use?
   yes

8. Was the information in the crosswords/puzzles relevant to the course?
   yes

9. Please explain
   Crosswords were a fun way to revise relevant terms and test yourself.

10. Was there anything about the crosswords that you found difficult / frustrating?
Only if I had forgotten the answer.

11. Have you any further comments about the crosswords?
It was a fun way to interact with the course without having to worry that if you got it wrong it would affect your course.

Audio files:
Please complete the following series of questions if you accessed any of the mp3 files (Preparing for your ECA; More Quick Tips on Preparing for your ECA; essay writing tips; more essay writing tips):

12. Which of the audio files did you access?
Essay writing tips ✓
More essay writing tips ✓
Preparing for your ECA ✓
More quick tips on preparing for your ECA ✓

13. Did you experience any difficulties with accessing the mp3 files?
no
Please explain
This was OK as I have recently got to grips with using an MP3 player so the software I had on my computer just converted it for me.

14. Were there enough mp3 files in your opinion?
Yes

15. Please give details on any other audio files that you would have liked to have had

16. How many times did you listen to the audio files?
A couple of times initially and then when I was working on my TMA2 and the ECA.

Additional materials:

17. Did you access any additional materials such as Word documents?
Yes

18. Did you use the links to additional online materials such as newspaper articles?

No

General issues

19. Can you suggest anything that would have made the resources easier to use / more relevant?

I didn't realise the crosswords were up there until quite late in the module and would have found them useful as I was reading the material. A prompt on the Student Home letting you know that there was new information on the Wiki may have been useful.

20. Did the resources enhance your learning?

Yes

Please explain

I found that the audio material and the tips felt more personal and less scary than just working through the materials on their own. It made me feel that the tutor was talking to me.

21. Did the material help you to feel more engaged / connected with (Please tick as appropriate)

- ...the OU? ✓
- ...your tutor group?
- ...your tutor? ✓

Overall

22. Do you feel as if you benefited from taking part in the mobile learning project and receiving the resources involved?

Yes

Please explain why you think this is

The course materials on their own and even the telephone tutorials are quite intimidating when you haven't studied for some time. Having the Wiki created an opportunity to do something a little less serious like the crossword. It also picked up on the things that I was worried about such as referencing and tips on the essay writing. It helped me to feel supported but not in an overbearing way.

23. Have you any further comments?

Thank you for the opportunity to take part and all the help you provided on the course.

Thank you for your help and time. Do let me know if you would like a copy of the final report.

Appendix 10: Tutors and mobile learning: student comments to one tutor

This tutor taught two courses, and these comments were gathered by her from questionnaires, the tutor group forum and emails.

The information provided in the podcast was relevant to me and expanded further on previous materials already provided. Most of the ihe information was timely. It coincided with the current stage of my M865 study. The use of voice was better suited my individual learning style.

Audio material made me feel like I was getting a more personal one to one session on how to approach the essay writing.

Very useful to have a link to a more visible picture of Afrodizzia, so that I could view the picture in close up.

The crosswords were great .... fun as well as useful! Very good for subliminally allowing information to lodge in the brain.

I found the online documents very useful, as I was able work when away from home .... The Wikis were also very interesting- a great range of resources altogether.

I found that the audio material and the tips felt more personal and less scary than just working through the materials on their own. It made me feel that the tutor was talking to me.

The course materials on their own and even the telephone tutorials are quite intimidating when you haven't studied for some time. Having the Wiki created an opportunity to do something a little less serious like the crossword. It also picked up on the things that I was worried about such as referencing and tips on the essay writing. It helped me to feel supported but not in an overbearing way.

They made some of the materials easier to understand.

Just to thank the tutor for taking the time and trouble to produce them for us to be able to comprehend the course material better.

It is wounderful to see this site. Specially for those like me who can't attend tutorials, I hope it will be an oppertunity to meet

other people who are doing K100. Also tutorial message also important. I'm really happy to see this site.

As the course I am currently studying uses the TGF [tutor group forum] as a compulsory part of its assessment, having used the TGF with K100 I felt I had a gentle introduction to the forums which was useful.

I did find the materials useful especially at revision time for learning specific glossary terms. They were very easy to use.

I always found the crosswords useful and enjoyable. Also I liked the paper copies to do at the start of tutorials as I liked to keep them in my file to refer to. I also found the mind maps that we did to brainstorm essay ideas also useful for reference later. Plus as a final revision your PowerPoint material on different body systems was fantastic.

The PowerPoint notes you put up were also very good and extremely useful at the end.

I didn't receive any web-based crosswords for revision but they sound very interesting. It was a shame, I would have really appreciated some things like this, but I suppose it is my fault for not making the tutorials.

Yes, I thought the crosswords were useful. They were a fun way of testing the knowledge gained from the course texts. The mix of difficulty in the questions and answers was good. Being able to answer most of each crossword gave me confidence that I was actually learning the material. The more challenging questions/answers stimulated a good search for an answer either somewhere in my head or as a last resort in the course books - either way a learning benefit was gained. Centering many of the Q&As around the learning outcomes including the bold terms was good too.

Overall, yes, I thought the crosswords were useful. I can't quite remember what it was but I do remember thinking that there was a problem with them. Something to do with not being able to take out a wrong answer? I would have liked more of them during our course and think they are a novel way of studying/revising, although they obviously only get you thinking about single words rather than whole concepts. Maybe a cryptic crossword type might be helpful too?!! Not that I could ever do a cryptic crossword!!!! I hope this feedback helps and thanks for using us as guinea pigs ;-)

I am afraid I did not make use of the crosswords, only because I didn't realise they were there as unfortunately I did not use the forums as often as I should due to time contraints. I am sure they would have been useful though.

Thanks for all your help with the course. i found the crosswords very useful. it is good to have an alternative revision source.

At first some clues expected spaces to be left, which threw me a bit, but with the normal crossword standard of no blank squares they were excellent.

To be honest I didn't make much use of the crosswords so I can't feel to comment on their effectiveness.

Appendix 11: Tutors and mobile learning: preliminary questionnaire to tutors - sample, Tutor 11

1. What student needs did you identify for which you could use mobile learning resources?

The main aims were to
- to facilitate the university's aim to encourage more students to access learning and support online
- to provide students with the tools to become independent learners and successfully complete their studies
- to provide support to tutors who wish to communicate with their students using alternative methods

I identified two groups of students:
[course code a] students who are level 1 students - TGF [tutor group forum] to be trialed and set up to allow them better access to tutorial information and study notes. Texting to be trialed to access contact students who are hard to read and have no internet access.
[course code b] Students who are level 2 students: Quizzes for revision purposes
[course code c] students who are level 1 science students. Audio files and podcasts. Quizzes for revision and other tutor access.

2. Which of the following have you used?
   - blog
   - audio
   - audio with RSS feed (i.e. podcast)
   - video
   - forum
   - quiz
   - other (please specify)

I have used quizzes, texting to mobile phones, and forums. I am now currently trailing audio-files and podcasts

3. How difficult has it been for you to provide mobile learning resources?
   - very easy
   - easy
   - ok
   - hard
   - very hard

Quizzes, texting to mobile phone, setting up forums and using audiofiles (via a TGF) Easy. I did have an initial attempt at a podcast, but found too time-consuming and fiddly (thus not an effective medium for level 1 students). I am still looking into this, however, for a new group of students on [course code c]

4. What software did you use? eg WordPress blog, Audacity for audio):

Quizzes: Eclipse software
Forums: OU TGF
Texting: OU Account with TXT Communications
Audio Files: The wav voice tag on the Tutor Group Forum

5. What other resources did you call on? (eg support from LDT colleagues, websites, friends and colleagues outside the OU)

Support from LDT,
Websites.

6. What problems did you encounter?

Texting to mobile phone: I initially looked a setting up a couple of accounts myself, but found the costing aspects difficult to quantify. The accounts also requested a lot of personal information to set up. It was then suggested we could trial TXT Communications which was set up and funded by the OU, and I used this without difficulty.
Podcasting: My initial recording was poor as the microphone did not pick up the students in the room- I have yet to re-try this.
Audio Files and the Eclipse Software: No problems encountered

7. How did you overcome them?

Texting to mobile phone: As mentioned above, the OU set up its own account facility and I therefore used this account
Podcasting: I still need to address this.

8. What limitations or restrictions did you discover? [eg file size, equipment, file storage]

Texting to Mobiles: The only limitation I noted was that if a student wanted to reply to a text then they had to remember to put the include put the tutors initials first, before they did anything else.
Quizzes - They are very good for revision, however, they do not allow for complex answers.
Audio files - very good, but they are only accessible through Tutor Group Forums (which not all OU courses have)

9. What could we provide that would help tutors to develop mobile learning resources?

Training. It was not until I started the H808 course that I fully understood the benefits of the full array of mobile learning resources

10. Do you plan to continue using these methods for the next presentation of your course?

Yes, all of them

11. Did the resources fulfil the student need that you identified initially?

Yes

12. Any other comments?

I have had some excellent feedback regarding the use of forums and quizzes

Appendix 12: Tutors and mobile learning: final questionnaire to tutors - sample, Tutor 2

1 At the beginning of the project, which of the following would you say best described your level of ICT skills?:

× *confident: comfortable using a wide range of software and hardware and using new tools*

fairly confident: familiar with a limited range of software and hardware - new tools can be difficult to master

uncertain: uncomfortable with technology generally

beginner: have engaged with technology sufficient for AL work

2 What tools did you use? Please indicate all that apply.

blog

× *wiki*

× *podcast / audio file*

× *text messaging*

asynchronous conferencing

synchronous conferencing

× *online quizzes*

× *online games*

vlog or commentated video

other (please specify)

3 What resources did you need?

equipment:.....*desktop and laptop pc; headset with microphone*

software:.....*Eclipse; Audacity; Quia;…Microsoft Word;*

web space:.....*PbWiki; OU document publishing area*

other:.....*Txttools service*

4 What support did you use?

× *web searches / help sections of websites*

× *from other ALs in the project FirstClass forum*

phone support from Jane / Nat / Mel

e-mail support from Jane / Nat / Mel

× *informal support from family members or non-OU colleagues*

× *other:.....videos on YouTube for how to work with Audacity*

5 Which of the above methods of support were the most useful for you?

all equally helpful.

6 How much did you enjoy working with and developing the mobile materials?

× *very much*

quite a lot

a little

indifferent

did not enjoy

Please add comments

This was a really useful opportunity to develop my skills and learn new software.

7 What other technologies, or new applications for technologies that you know about, would you like to try in the future?

working with video; webcams; instant messaging; Skype; Hot Potatoes; podcasting; other types of online games, puzzles and quizzes; Exe.

8 What advice would you offer other tutors thinking about trying out mobile materials?

Go for it, but be aware of the time it will take, especially if you are new to elearning. Also you need to make sure students are aware of the materials and where to find them.

9 Do you know or feel that the materials:

supported or enhanced learning	yes
supported the pedagogical approach / had educational value	yes
were used and appreciated by students	yes
enhanced your relationship and communication with any of your students?	yes

10 Can you say how or why the materials might have worked in this way?

The materials provided new ways of reinforcing previous

learning using an informal approach that students told me they enjoyed.

11 Have you any evidence to show this? Please supply below.

Audio material made me feel like I was getting a more personal one to one session on how to approach the essay writing. (student)

Very useful to have a link to a more visible picture of Afrodizzia, so that I could view the picture in close up. (student)

The crosswords were great .....fun as well as useful! Very good for subliminally allowing information to lodge in the brain. (student)

I found the online documents very useful, as I was able work when away from home .... The Wikis were also very interesting- a great range of resources altogether. (student)

12 Do you know whether the students were using the materials in a mobile way or mostly at their desks?

mostly mobile

× *mostly at home*

don't know

13 Having now developed mobile materials and had some practice at doing so, would you have enough time - under the terms of your current AL contract - to do something similar for future tutor groups?

to a limited extent. Feel more confident now so would make better use of existing time.

14 At the end of the project, which of the following would you say best described your level of ICT skills:

× *confident: comfortable using a wide range of software and hardware and using new tools*

fairly confident: familiar with a limited range of software and hardware - new tools can be difficult to master

uncertain: uncomfortable with technology generally

15 Can you give examples of anything that you have learned during this project that you can use again in the future? (resources / skills / knowledge)

How to record short audio files in mp3 format. Am now much more aware of what makes a good podcast - techniques for recording etc. Now know how to make podcasts (but learnt this on H808 rather than on this project).

16 What, ideally, would the OU need to provide for students or tutors in order to support the kind of work you have done in your project? (hardware / software / training / course materials / etc.)

Ongoing access to equipment such as microphones, voice recorders, webcams for those who don't already have them; ongoing support via a discussion forum; webspace where we can upload files, including mp3 files.; materials on how to use software e.g. Audacity, Juice. Basic handouts/materials on using software such as Audacity.

Appendix 13: Interview plan

Basic information:

Date of interview
Name
Experience in student support

Introduction to the research
Confidentiality of conversation
Permission to record the interview

- What generic skills can students develop that will help them to succeed [at university / as distance learners]?
    - prompts: broad, not only practical, generic: cognitive, affective, organisational; soft skills
- What are the main aspects of study support that can enable distance / HE students to do well in their studies?
    - prompts: information, resources, people, contact; are some of key importance?
- Do you think that there are ways in which skills and knowledge can be facilitated or enhanced by mobile learning?
    - prompts: extension of online options; more than just a tool?
- Are there ways that 'affective' aspects of study (such as confidence, motivation, autonomy, self-direction, community) can be encouraged by the institution.
    - prompts: virtuous learning cycle, building on confidence
- Is there much difference between what is needed by on-campus and distance students?
    - prompts: access to people, organisation of institutional processes
- What do you think are the key areas of study support that a distance education institution offers?
    - prompts: proactive support, front loading, vulnerable students

Appendix 14: Annotated extract of Interview A

Interviewee A, July 2008 - mid-interview

JL: Do you think that there are ways in which skills and knowledge can be facilitated or enhanced by mobile learning? - for both practical and soft skills	
Int A: It seems to me that if you had asked me this say two years ago I would have said the main way that mobile phones could be used would be through texting particularly … and prompts at particular times through the life-cycle to enable students to remember things or to give them motivational-type messages or whatever - but I think this new generation of mobile phones, which have probably only been around for a couple of years, if that really - more and more and more people are now using them to access the web and that therefore brings with it a whole load of opportunity which I don't think was there before. But it seems to me that if you want to use mobile phones to enable students to link to study skills stuff then trying to do it through a normal website is probably not appropriate and you need to get a specific mobile phone related website because of the difficulties of downloading from the web, of looking at things through a very small screen on a mobile phone.	options for using texting for support
JL: So it's partly the screen and what you can put on it and partly just getting yourself around a normal website?	
Int A: Yeah well I think so. I mean my experience of doing it - and I'm pretty much a Luddite so I'm not a standard 18-year-old by any stretch of the imagination - is that using the internet with a handheld mobile device is actually quite tricky, and therefore it's much easier if you can go to a mobile - they've got a special name and I can't think what it is - but they're sort of mobile-enabled websites really and they're sort of small and they work with that very small screen …	need to design specifically for mobiles
JL: ... with a very strict navigation which you just step through.	
Int A: .. umm, so it seems to me that with this new generation the sky's the limit. And I think there's still a role for texts, and particularly because texts tend to be free for the user, the recipient, and that's an important thing, whereas it's still relatively expensive to surf the web with a you know with a handheld device, and therefore there's cost issues, but that's just going to go down and down and down and I think it's going to become more and	texts generally free to recipient mobile access costs dropping improved mobile

more that we use the web through our mobile phones and they're going to have better capability and they're going to be quicker and they're going to be … you know, we'll design things to work better from that kind of thing.	capabilities
JL: Is it something that [university Y] used at all?	
Int A: We hadn't used it hugely. We experimented a little bit with using texts in a very low-level way so we'd, if students made appointments we'd send them a reminder as a text. Where students had asked for particular, around careers advice we'd get them to let us know what their particular areas of interest were and we might e-mail or text them if there was an event or a speaker or some special do coming up which they had said was relevant to what they were looking for … but nothing as sophisticated as using study support. But then having said that you have to remember that nothing as sophisticated as study support happened at [university Y] given that, you know, the type of university it is.	using texting on campus-based university
JL: What skills do you think are key - just forgetting the mobile - what support do you think students need more than any other to get through university?	
Int A: Learning skills, do you mean, learning skills? Well golly, there's the whole gambit, isn't there. I don't know if I could pick any out particularly. I think what you need to do is look at the student life-cycle and help the student identify what their needs are in relation to their studying. And of course when they start they don't know that. So it's about helping them to learn how to learn and helping them to self-assess how they learn and what they may need to do in order to learn more effectively, or for many students it's not just effectively it's more efficiently: time, time as well. So I don't know I can give you an answer 'if only everyone could write an essay we'd have no problem', well clearly that's a key skill but, but there's a whole load of skills that I would say. And I think, I think the key to successful learning is this learning how to learn, so if I was going to give it anything that's what I would say it is. But then everything comes off that doesn't it, so … it's a bit of a cheat really. But what that enables you to do is it enables you to personalise it all and individualise it, so that if the student has an understanding of what it is to learn, they can then identify what they have	base learning support on student life-cycle learning how to learn is key skill personalising support makes it more effective

particular issues with, what they need help with in terms of their learning development, and therefore you can tailor things specifically for them as an individual rather than saying 'all students need x'. Even if the majority of students need x, if you can embed it in the individual it's going to work better.	
JL: And the other things like persistence and motivation - the other kind of things that actually get you through - do you think there's a way of encouraging that through resources?	resources for soft skills?
Int A: Yeah, I think again you can use texts. I mean, texts, I think, still are king at the moment in terms of learning support because of the fact that they are pretty much free at the point of delivery umm and therefore they have their use. On the other hand you've got to be careful that they don't want to stick a finger down the back of their throat and vomit if you send too - some motivational-type things can be awful, and it's a real fine line and again dependent on the individual. The other thing is that some people will see it as a nuisance while others will see it as encouragement, and therefore to have some sort of opt-in or opt-out system - I would say an opt-in rather than an opt-out - at this stage I think would be essential. Because what you think is motivational could become de-motivational if you get the wrong person.	need for care with supportive messaging student must have opt-in choice
JL: [brief overview of texting pilot work - removed]	
Int A: I think that looks good. I mean I think the thing is that the difference between a university like [Y] and the OU is that the OU is pretty much centralised. That once the course materials are produced the faculty or the school doesn't have an awful lot to do with it other than maintain the course, but the relationship with the student is a centralised relationship. It might be by the - are they still called tutor-counsellors, or tutors, or whatever - but it's still very centralised, and in university like [Y] it is not that. It is very devolved. So the individual relationship, the learning relationship that the student has, is less with the university and more with their individual school or faculty, and actually more with their individual course or even with an individual tutor that they may have, academic, member of academic staff, so the opportunity in a university like [Y] to say 'your assignment's due' is not a centralised opportunity. It would be dependent on getting the	distance education institution can centralise campus-based uni devolves support - relationship is between student and individual lecturers cannot centralise support, would be done by lecturers

tutor to do that. Now of course some tutors are really good and may be doing it already, for all I know, and some of the will be Luddites, but what it implies is that with a university like [Y] in order to bring this sort of thing more to the fore you have a massive staff development job to do. Massive. So in terms of blended e-learning, which is what they are trying to develop, because they are never going to be completely distance, they don't want to be, but they are interested in blended learning, there's a mountain to climb because nothing really can be centralised, so it's all dependent on individual lecturers. [campus-based example removed - not relevant] I think some lecturers probably are using texting but it's a much more personal relationship so it's less of a 'let's send out a mailing to everyone or text to everyone telling them their assignment 1 is due' and 'congratulations you've done really well in your first assignment' and much more of an individual relationship and I'm sure that texting is used, you know, quite a lot.	so campus-based has huge staff development issue texting as part of personal relationship at university Y
JL: ... in a much more personal way	
Int A: That's right. Each student will have a personal tutor and have a particular tutor for a particular course, because it's still pretty traditional in the way that things are done. A typical undergraduate, you know depending on what the module is, will have two or three lecturers delivering a particular module. And their relationship is with them.	campus undergraduate relates to 2-3 tutors on a module
JL: Yes, so what the OU's central benefit is that you can mass-mail three thousand people rather than 20. Because otherwise it's down to the tutor.	distance education can centralise
Int A: Exactly. It's down to the tutor. And you don't get that done unless you do massive staff development, and even if you do do staff development, if you manage to get them to come along, only a very small proportion of them will take it up anyway.	reliance on tutor = staff development

Appendix 15: Developments in OU provision of mobile learning

In 2007 the Vice-Chancellor of the OU stated in her Council and staff address that m-learning "is increasingly where we need to concentrate" (Gourley, 2007 p.2). The position of m-learning in the OU has developed considerably since this statement was made and this appendix gives a brief summary of some of the work that is ongoing in various areas. I include this information because, while I was undertaking my own research, OU colleagues were sharing information about their own m-learning work and this influenced my own knowledge and thinking. After a brief overview of some of these developments I describe a short message service (SMS) texting study that followed the tutors and mobile learning study described in Chapter 5.

There is continuing research, some of which is in partnership with other institutions and organisations. This includes VLE-based mobile learner support that involves activities including SMS, instant messaging, m-assessment, mobile course content and (in response to student surveys) tailored services; a variety of associated mobile research supported by the Centres for Excellence in Teaching and Learning (CETL); podcasting, supported within the faculty of Mathematics and Computing; a discussion about the use and implications of mobile technologies for level one courses currently in development; a project investigating first year students and their expectations and experience of digital networked technology; and an Economic and Social Research Council (ESRC) funded project - The Net Generation: encountering e-learning at University. Other research includes e-books that allow student annotation, user-generated content and assessment work with the faculty of Languages, and a study linked with the University of Cambridge

for the Arcadia Project that surveyed student and staff information requirements with particular focus on the development of library services (Mills, 2009).

Other developments are past the research stage: a physical library area specifically designed to introduce new technologies to staff in the form of hardware, software and printed resources; an audio recording suite for the creation of podcasts; a number of courses that include m-learning options in their design; an Enabling Remote Activity Project that uses handheld devices to allow mobility-impaired students to participate in fieldwork at residential school; SMS texting for student services to be incorporated into the communications system and rolled out in 2010; an RSS feed for study skills resources; student resources that include media suitable for mobile download; public access to materials on iTunes U[niversity]; and establishment of external OU areas on Facebook, YouTube and Twitter.

The VLE has made various online tools available, including blogs, wikis, forums and audio recording, for use within course design and as additional media (subject to approval of tutor request). The type of resource development that the tutors undertook in the mobile study is now very much simpler to organise because the tools are readily accessible through a tutor's own OU page, and similarly their students have direct links on their own personal student pages.

Staff development has been identified as an issue during this research, particularly for tutors using unfamiliar technologies. In a distance education institution with widely scattered administrative centres it can be difficult for staff to keep up-to-date. Staff development covering technologies such as using the VLE and its tools, or for work such

as podcasting or using social media, is readily available for central staff (many of whom develop course materials), and staff working in administrative centres also have staff development programmes. All staff have access to instructional training information and to 'good practice' online information about ways to choose and use the tools with students. The employment of more than 7000 part-time tutors can make their staff development provision difficult, particularly as they are almost all, by definition, at a distance from both the main Milton Keynes campus and from their 'local' regional or national centre, but it is provided in various ways. Central training is also offered to regional representatives who then disseminate that training to colleagues.

SMS texting study

This study took place during the second and third years of my research. I was particularly interested because it further investigated texting, a key type of m-learning provision, and was focused on student support, whereas much of the research in the literature was connected with learning and mostly related to courses. Importantly, it took a different approach to support development: the tutors and mobile learning study was designed to explore what could be developed by individual tutors for their support of students on a variety of courses using various technologies, while the texting study was designed to investigate support provision using one option (texting), developed centrally for one course, and the potential of such mobile messaging as a method of student support and contact. Additionally, the earlier study used tutors as a liaison point with students, while the texting study gave direct access to student

feedback. For these reasons I include this description, though I must make it clear that the study was not part of my own research plan.

A small amount of early research on texting had been initiated in the OU: the tutors and mobile learning study, during which four tutors had used a texting service, was coming to an end; in-bound texting was being offered by marketing so that enquirers could request a telephone call by text to discuss their course options; other texting research work was in progress, including plans to consider assessment-related, administrative and other processes. However, at the time direct student support had not been addressed. Outbound messaging requires the collection and secure storage of mobile telephone numbers together with permission to use them for text alerts, and might be difficult with the potentially large numbers of students involved.

I was closely involved with the development and design of the study because it was being run within the team in which I work and fell within my remit. In practical terms this meant that I helped to design and develop the form of the study and the type and frequency of the texts, which were based on items on the course calendar that students already use as a scheduling aid. The study was run by a colleague with technical expertise and a knowledge of texting systems and we worked with the course chair of a second level psychology course to devise the messages, and later to develop the end of study survey questions, through which we partly tried to discover possible future uses for mobile use by the OU. After the initial development work my further involvement was largely advisory.

This study offered a practical investigation of SMS use as a means of supporting students on a course, providing a combination of both course-related and more general student support messages. The course ran from October 2007 to July 2008 with a student population of around 4,500 students. They received an email inviting them to take part in a text-messaging study and within a week 450 volunteered to take part by adding their mobile number to their personal records page on StudentHome. The study had an associated dedicated website which contained information about the study, answered common questions, held an archive of messages, allowed people to unsubscribe to the service and included a feedback form. Students could not reply to messages, but the support site URL was included with each message. To ensure that recipients knew that messages were officially from the OU, the sender was identified as OU-TEXTS.

The 160-character constraint of SMS messaging meant that it was initially difficult to produce messages that gave enough information to be useful (having already used up 24 characters for the website URL). We decided on a series of 20 messages, to send no more than two in a week. We wanted to ensure that the tone of the messages was friendly and encouraging: this is a sample.

> 15.12.07
>
> This week is set aside for starting on your assignment, due on 9th January. Don't worry if you haven't completed TMA01, you can still pass the course. More: www.open.ac.uk/sms

On the supporting website this additional information was provided for this message.

> There are several sources of help in preparing for TMA02. If you have received your marked TMA01 look at your tutor's feedback on the script and on the summary sheet. The assignment booklet contains guidance on what to include in TMA02 and the workbook (pages 34-41) has advice for tackling the process of essay writing. If you have queries about what is expected in the TMA or particularly if you didn't submit TMA01 you can contact your tutor or study support at your regional centre.

Appendix 16 shows 16 of the messages (Carberry, 2008), which pointed out upcoming events in the life of the course, mentioned optional course resources that are sometimes ignored by students, identified services and skills support within the course and elsewhere in the OU, and invited sign-up for the associated residential school. The course team had the option of adding last-minute messages (for example about a relevant television programme or news story).

Students did not use the site feedback form but Carberry carried out evaluation in March/April 2008, in which 193 of the 450 students responded to a short questionnaire that could be answered by text: this was 43% of those who chose to sign up for the service. (Appendix 17 shows the survey questions and Appendix 18 a summary of all responses, including comments.) 85% of respondents found the service useful and 78% thought that the frequency of messaging was about right. Providing the right balance of reminders without being intrusive is an important part of such a service, as people could become annoyed by the wrong tone or frequency, and unsubscribe (a point mentioned later by Interviewee A). Students suggested other potential OU uses of a mobile phone and most students would have chosen to text for example EXAM to the OU to get their

date and venue, or TMA to get their next assignment due date. Other students did not want such items, which is why such a service should allow students to choose which types of message they want.

It is important to note that the messages provided a form of extra support, but texting could not be the only way of giving information to this student cohort because only 10% were receiving texts. (A common problem in the OU is identifying the best way to make student contact when not all have or use email, not all are contactable by phone, and there are high resource costs in sending letters.) In fact in a survey response below (see questions in Appendix 17, summary of responses in Appendix 18), students wanted to receive text messages *as well as* emails rather than *instead of* emails.

16. If the option was available, would you like to receive text messages...

(Please select one only)

...instead of emails?	2.72%
...as well as emails?	97.28%

The texts proved useful as reminders, because sometimes students had misread the assignment due dates on their course calendar. This suggests a real practical role within student support: the texts kept students to time and encouraged them to work on certain learning areas, although they did not of themselves promote learning (nor were they designed to do so in this case). For example, when asked whether they had been reminded to do something they might have forgotten (Q.8), these students said:

"The sms message helped me to keep on track with my studies and remind me of where I should be at with my studies. This enabled me to reflect and was motivational within my study."

"The text messages haven't really reminded me of something I would have forgotten but have acting [sic] as a timely reminder for things that I might leave until the last minute. When work is busy it is sometimes easy to get behind and not check the website but with the text message service you get nice little prompts."

"Reading and completing the optional activities on the course. Keeps me up-to-date with what I should be doing or have done."

A few people did not receive texts: in some cases they had changed their mobile numbers and had not updated their record. However, a number of students made positive additional comments that involve a feeling of support from the institution.

"helps a lot with the feeling of being alone with your study."

"I perceive the receipt of texts as supportive and encouraging as distance learning can make one feel isolated at times."

"I'm not sure that the service offers anything radically valuable to OU students, but as with other media offered by [the course], it certainly contributes to the overall sense of being engaged with a world of studies while on a distance learning programme of education. I particularly like the way that the messages that I've received have been phrased in an appropriately succinct format,

> appropriate to the media. From my experience these have added colour and a new dimension to my studies, and though they haven't really changed my study approach they have offered useful memory prompts and contributed to a global sense of 'time-line' for the course."

Each message sent (ie one message to one recipient) cost about 4.2p, but text costs are falling and a bulk contract would be cheaper. At the time most students did not want to pay for such a service, but now bulk texts are being included in mobile phone contracts and more people have 'free' or cheap texts at their disposal. If a paid service were implemented it would have to be balanced by free texting for financially disadvantaged students.

This study provided some strong evidence that students can make good use of texting and the information was disseminated within the university. It was hoped that further courses would use this model for providing advice and guidance through texting. Any texting system chosen for an HEI would need to integrate easily with its other administrative technology systems. Other SMS research (although not within distance education) by Horstmanshof (2004), Harley et al. (2007) and Jones and Edwards (2009) similarly found that students were willing to use SMS as a means of communication between themselves and their tutors and other supporting staff, and supported findings such as SMS being a better way than email to attract student attention, and that they felt more involved with the institution.

Appendix 16: Texting pilot study: text messages sent, and additional website material

Here's a list of all the messages we've sent so far **plus some additional information** that we couldn't fit in the original texts.

Help us improve the texting service – complete this short questionnaire. <link>

14.05.2008

TMA06 is due on the 21st May - great, it's the last one! More: www.open.ac.uk/sms

10.05.2008

Assignment week for TMA06 - choose your topic, get it in early and move on to your revision. More: www.open.ac.uk/sms

17.04.2008

TMA05 is due on 23rd April. More: www.open.ac.uk/sms

12.04.2008

Assignment week for project work - Chapter 11 and DVD Programme 4 will help, and if you get stuck talk to your tutor. More: www.open.ac.uk/sms

22.03.2008

If you're up-to-date, this is a good week for reviewing DVDs and other optional material. More: www.open.ac.uk/sms

12.03.2008

TMA04 is due on the 19th March - and then see video clips on the course site. More: www.open.ac.uk/sms

01.03.2008

Book One is done and you're more than half-way through the course - assignment week for TMA04, find essay skills help on SkillsforOUStudy

06.02.2008

TMA03 is due on the 13th February. More: www.open.ac.uk/sms

19.01.2008

Time to book your residential week if you haven't already done so - more choices available if you book early. More: www.open.ac.uk/sms

12.01.2008

Assignment week for TMA03 - it'll help to attend a tutorial - if you can't get to your own, use the tutorial finder to find an alternative. More: www.open.ac.uk/sms

02.01.2008

Hope you enjoyed the holiday period. TMA02 is due on the 9th February - get help from your Methods Book. More: www.open.ac.uk/sms

29.12.2007

Want a break from Christmas TV? Catch up on the DVDs, video clips and audio - it's optional but enlightening. More: www.open.ac.uk/sms

The DVDs, video clips and audio programmes support the material that is presented in the course. There are clips of "classic" studies such as those by Milgram and Zimbardo, videos of behaviours described in the textbook, for example ant-dipping in chimpanzees, and discussions that extend your reading such as that on identity and disability.

15.12.2007

This week is set aside for starting on your assignment, due on 9th January. Don't worry if you haven't completed TMA01, you can still pass the course. More: www.open.ac.uk/sms

There are several sources of help in preparing for TMA02. If you have received your marked TMA01 look at your tutor's feedback on the script and on the summary sheet. The assignment booklet contains guidance on what to include in TMA02 and The workbook (page 34-41) has advice for tackling the process of essay writing. If you have queries about what is expected in

the TMA or particularly if you didn't submit TMA01 you can contact your tutor or study support at your regional centre.

08.12.2007

Start using SPSS on your computer this week. More: www.open.ac.uk/sms

SPSS is a very powerful statistics programme that is widely used in Psychology and Social Science. DSE212 will introduce you to using SPSS to organise your data and carrying simple analyses. The SPSS booklet contains full details of how to use the programme and your student home page has contact details for the computer help desk should you encounter any problems.

07.12.2007

Welcome to the texting pilot. We can't accept replies, but more message information is always available on [www.open.ac.uk/sms/dse212]

Every time you receive a text message we will post additional information here.

27.11.2007 (initial e-mail)

The Open University SMS texting service sends useful alerts direct to your mobile phone.

It's currently a pilot service aimed at students studying [course name] – on the **October 2007 presentation.**

The messages that you receive will be tailored to your study needs. So, for example, if you have finished a course and are considering what to do next, you will receive information on course choice.

The service is free of charge (unless you are outside the UK) and will be piloted for the duration of the course. If you would like to receive these text alerts, go to the StudentHome 'personal details' tab and enter your mobile phone number. You can unsubscribe from the service at any time.

Appendix 17: Texting pilot study: text survey questions

OU Texts Pilot 1 Questionnaire

You have been taking part in the [course code] text message pilot. For the last few months you have been receiving text messages from the OU (OPEN-TEXTS). We are evaluating the pilot to see if the service is useful and should be continued. Please help us by answering the questions below.

Remember that if you want to stop receiving text messages you can visit your personal preferences page on StudentHome. [Opens in a new window]

1. How useful have you found the SMS pilot so far?
2. How do you feel about the frequency of messages sent?
3. Would you like to have more specific preferences available (e.g - "only send me items relating to assignments")?
4. What kinds of message would you LIKE to receive?
5. Is there anything you would specifically NOT want to receive by text?
6. Did you look at the additional material on the supporting web site (www.open.ac.uk/sms/)? [Opens in a new window]
7. If 'Yes', how useful was it to you?
8. Have any of the text messages in this study reminded you of something you would have otherwise forgotten?
9. Would you like to be able to contact your tutor by text?
10. Would you like your tutor to be able to text you?
11. Would you like to be able to text the OU for information? (e.g. "Text TMA for the due date of your next TMA", "Text EXAM for the time and venue of your next exam", "Text TUTORIAL and your postcode for local times and venues for tutorials", "Text NEXT COURSE" to have someone call you to go over your options")?
12. What else would you like to use your mobile for?
13. Would you be prepared to pay for text alerts from the OU?
14. How important to you is the ability to stop the texts by texting 'stop' to the message sender rather than by using StudentHome?
15. When would you most like to receive text messages?
16. If the option was available, would you like to receive text messages...
17. Would you be happy to use the text message service again?
18. Please let us know anything that's not already been covered about the text service that would be useful for us to know.

Thank you for taking the time to complete this questionnaire.

Appendix 18: Texting pilot study: text survey summary

Responses from Open Texts SMS Pilot 1 - Mon April 21 2008

Number of responses: 193

OU Texts Pilot 1 Questionnaire

You have been taking part in the DSE212 text message pilot. For the last few months you have been receiving text messages from the OU (OPEN-TEXTS). We are evaluating the pilot to see if the service is useful and should be continued. Please help us by answering the questions below.

Remember that if you want to stop receiving text messages you can visit your personal preferences page on StudentHome. [Opens in a new window]

1. How useful have you found the SMS pilot so far?

(Please select one only)

Very useful	75	39.27%
Fairly useful	87	45.55%
Not sure	10	5.24%
Not very useful	15	7.85%
Not at all useful	4	2.09%

2. How do you feel about the frequency of messages sent?

(Please select one only)

Too few messages	40	21.05%
Too many messages	2	1.05%
Just the right amount of messages	148	77.89%

3. Would you like to have more specific preferences available (e.g - "only send me items relating to assignments")?

(Please select one only)

Yes	76	40.00%
No	70	36.84%
No opinion	44	23.16%

4. What kinds of message would you LIKE to receive?

(Please select all that apply)

Course options	91	47.15%
Tutor contact details	55	28.50%
Exam or Assignment notification dates		

	166	86.01%
Exam or Assignment result notifications		
	159	82.38%
Next course options	106	54.92%
Study skills	69	35.75%
TV programme reminders	124	64.25%
Other - *please specify here*:		
	18	9.33%

- 'Marked assignment available' messages
- Encouragement and Motivational!!!
- I haven't received ANY text messages!
- If it's possible for you to know if one's behind with their study, to send details of how to catch up, or details of the relevent study needed to catch up
- Interesting teaser messages about this week's material encouraging us to read on and find out more.
- Next tutorial dates and venue
- Notification of errors in textbooks (before assignment due date)
- Supportive messages, something to encourage those that may be behind
- TMA Hints/Tips
- TMA results ready for collection
- Tutorial agendas
- Tutorial dates
- Tutorial reminders
- Upcoming dates for tutorials would be helpful...I am always forgetting
- Upcoming events e.g. revision weekends
- Weekly timetable reminders
- any special dates and events relating to OU
- motivational thoughts/quotations
- next tutorials
- relevant email notification
- reminder about extra course resources, eg the films available on the course website
- reminders and encouragement to work
- tutorial reminders
- updates to tutorial times
- useful facts relating to the current subject material

5. Is there anything you would specifically NOT want to receive by text? *(Please select all that apply)*

Course options	25	12.95%
Tutor contact details	40	20.73%
Exam or Assignment notification dates	3	1.55%
Exam or Assignment result notifications	12	6.22%
Next course options	25	12.95%
Study skills	33	17.10%
TV programme reminders	18	9.33%
Other - *please specify here*:	3	1.55%

- OU 'adverts' such as TV programs, union etc - stick to course associated info
- marketing

6. Did you look at the additional material on the supporting web site (www.open.ac.uk/sms/)? [Opens in a new window]

(Please select one only)

Yes	28	15.14%
No - Please go to question 8	142	76.76%
Not sure - Please go to question 8	15	8.11%

7. If 'Yes', how useful was it to you?

(Please select one only)

Very useful	8	27.59%
Fairly useful	16	55.17%
Not sure	4	13.79%
Not very useful	0	0.00%
Not at all useful	1	3.45%

8. Have any of the text messages in this study reminded you of something you would have otherwise forgotten?

(Please select one only)

Yes	59	30.89%
No	132	69.11%

If 'Yes', what? *Please specify here:*

- *I have thankfully managed to work ahead of schedule
- An assignment date: I thought I had two weeks to cut off but realised from the text it was only one.

- An up and coming TMA cut of date in a time where i was very busy outside of OU work.
- Assignment
- Assignment cut off dates
- Assignment due
- Assignment was due in!
- Booking a residential course for DSE212.
- Catch up on reading material
- Cut off dates
- DVD material to watch
- Further resourses but even with assistance the information was inaccessible.
- I thought I had fallen behind with the course and was starting to panic but the text arrived showing me that I was still on track.
- It reminded me of impending TMA deadlines
- It reminded me to start an assignment when I was in the middle of moving house!
- More of a prompt
- My TMA deadline
- Reading and completing the optional activities on the course. Keeps me up-to-date with what I should be doing or have done.
- TMA cut off date
- TMA cut off dates, study materials to look at / read.
- TMA dates
- TMA due date
- That TMA 04 was due on 19th March, which I had in a diary but it was the text that made me realise how close the deadline was and 'woke me up!'
- The TMA
- The sms message helped me to keep on track with my studies and remind me of where I should be at with my studies. This enabled me to reflect and was motivational within my study
- The text messages haven't really reminded me of something I would have forgotten but have acting as a timely reminder for things that I might leave until the last minute. When work is busy it is sometimes easy to get behind and not check the website but with the text message service you get nice little prompts
- Thet were useful reminders
- To watch the dvds
- Viewing DVD programmes
- Well actually it told me the correct date that a TMA was due, somehow I thought it was due the 15th when actually it was the 19th! So it was a relief!

- When a specific TMA was due.
- assignment deadline
- assignment deadlines - (2)
- assignment weeks!!
- cannot remember but i know it has been very useful in keeping me up to date.
- essay week
- hand in dates for assignments
- I thought that an assignment was due two days after it was actually due, the sms message was very helpful in preventing me from handing in my work late. thank you.
- just keeping up to date with the course agenda.....so i dont get behind which would put to much pressure on me thanks
- keeping on track with study planner
- keeping reading up to date
- keeping up to date with where I should be
- prompts to begin assignment
- relevant times to view dvds
- reminder about the video-clips on the course website
- study timetable, assignment due dates
- time table & reminders
- tma due date
- tma due dates
- to do my work
- to look at the dvds and catch up on material in the consolidation weeks
- tutorial
- tutorials
- watching a dvd
- well not forgotten, but reminds me of my upcoming tmas!!!! :)
- yes when i have needed to get things done by and when things are coming up in my course.
- -

9. Would you like to be able to contact your tutor by text?
(Please select one only)

Yes	124	65.26%
No	56	29.47%
Already do	10	5.26%

10. Would you like your tutor to be able to text you?
(Please select one only)

Yes	152	80.85%

No	29	15.43%
Already does	7	3.72%

11. Would you like to be able to text the OU for information? (e.g. "Text TMA for the due date of your next TMA", "Text EXAM for the time and venue of your next exam", "Text TUTORIAL and your postcode for local times and venues for tutorials", "Text NEXT COURSE" to have someone call you to go over your options")?

(Please select one only)

Yes	147	77.37%
No	17	8.95%
Not sure	26	13.68%

12. What else would you like to use your mobile for?

(Please select all that apply)

OU games	16	8.29%
OU web pages	48	24.87%
Locating nearest tutorial centre (map)	61	31.61%
Other - *please specify here*:	9	4.66%

- Acess support from staff tutor perhaps.
- Communicating with fellow students, using OU server as secure message switch /router
- Just text and answer phone.
- collecting essays?
- everything possible
- just receiving ou texts
- none
- phone calls
- to make telephone calls only

13. Would you be prepared to pay for text alerts from the OU?

(Please select one only)

Yes	8	4.21%
No	112	58.95%
Not sure (depends on cost)	70	36.84%

14. How important to you is the ability to stop the texts by texting 'stop' to the message sender rather than by using StudentHome?

(Please select one only)

Very important	26	13.68%
Important	49	25.79%
Neither important nor unimportant	75	39.47%
Not very important	25	13.16%
Not at all important	15	7.89%

15. When would you most like to receive text messages?
(Please select one only)

Morning	24	12.70%
Afternoon	19	10.05%
Night	5	2.65%
Doesn't matter	141	74.60%

16. If the option was available, would you like to receive text messages...
(Please select one only)

...instead of emails?	5	2.72%
...as well as emails?	179	97.28%

17. Would you be happy to use the text message service again?
(Please select one only)

Yes	184	97.87%
No	4	2.13%

- **18. Please let us know anything that's not already been covered about the text service that would be useful for us to know.**
Please state:

As I have not received a single text yet, I have not completed other questions. Is this maybe because I am in Ireland?

- I don't always get chance to check my e-mails as frequently as I would like. Texts reminding me of when next assignment is due (for example) remind me that although its distance learning, I'm not alone. It feels like an extra layer of support. -I find this a very useful service.
- I have so far not found the service useful because it hasn't told me anything new, however notifications of when results are available is a good idea.
- I like the idea of text messages in principle but only when they communicate useful info - such as check your email / you have an assignment marked. Most of the messages have been of the 'TMA due in 3 weeks' nature which a) I already know and b) don't warrant a text - email would be fine! This type of text would only be useful to people who don't regularly use studenthome and/or email.

- I perceive the receipt of texts as supportive and encouraging as distance learning can make one feel isolated at times.
- I think this servcie is very useful and helps me remember things.
- I'd probably prefer to get everything in emails, though a text to let me know an assignment was marked would be good.
- I'm not sure that the service offers anything radically valuable to OU students, but as with other media offered by DSE212, it certainly contributes to the overall sense of being engaged with a world of studies while on a distance learning programme of education. I particularly like the way that the messages that I've received have been phrased in an appropriately succinct format, appropriate to the media. From my experience these have added colour and a new dimension to my studies, and though they haven't really changed my study approach they have offered useful memory prompts and contributed to a global sense of 'time-line' for the course.
- In principal the text messaging service is a good idea but I have found it a little superfluous in sending messages about TMA's etc that I was already aware of. In my humble opinion, someone relying on a text to remind them when their TMA is due probably shouldn't be doing the course!
- It is a very good idea, especially for people like me who only use their mobile for calling and speaking to people. Also as I am not always able to get access to emails when I require it. These texts can keep me up to date with where I should be. However, I do not work and if I were paying for my courses I would have no problem paying for such information, but I could not afford to pay for them in my present situation because every penny counts. Therefore I do appreciate them, especially as they are freely available, but I do know resources are tight now that the Government is squeezing the OU funding. Thus unfortunately, this service would probably be best be left and the funding used on courses to aid those like myself, people needing to escape governmental 'squishing' of those trying to better themselves and trying to provide themselves with a future and a living and not just an existence; by aiding them to acquire further education to improve their living standards, instead of constantly having governmental-fingerpointing and constant checking up, despite doing further education constantly making your life a misery, just to get you off the unemployment register.
- It would be useful to get each weeks schedule on a Sunday or Monday, eg "This week read Chapter 6 and listen to Audio 2a".
- It's a great service and as communication and technology is so important it gives the OU more credibility as a 'happening' university.

- Its a bit disconcerting when a text arrives from you in the middle of a tutorial (I am a carer so need my phone on at all times)
- Mobile no was changed as the text messaging services started. Hence no messages received. I didn't inform OU. An email to check on correct mobile no every so often might help here.
- My answer to 17 is maybe - depends if we can select purpose
- Personally, I found that receiving notifications about assignment dates was an unnecessary additional pressure because I already knew the deadlines and given I was always running late, this was not perceived as a nice reminder. Should the circumstances have been different, I can see that this is a useful tool.
- So far I haven't received any text messages, and had forgotten that this was supposed to be happening. So something has obviously gone wrong!
- Some of the messages are pointless. Why text suggesting I take this opportunity to 'catch up', 'review DVDs' etc? I am perfectly capable of organising my own time. I want text version of email info as my work takes me to many countries for one or several days... Its a means of keeping in touch with OU communications that complements, not replaces, other forms of communication. -
- Think it's useful facility and a reassuring one given that I was ahead of schedule but I don't think I'd have felt the same if I was behind. I would certainly welcome more available contact for student study support.
- Working students in fulltime employment it is often easy to get too caught up in work/life that studying gets put off temporarily. While this leeway can be used judiciously (especially as we are responsible for our own learning) it can also lead to one falling behind. Reminders by text would be quite useful
- helps a lot with the feeling of being alone with your study
- i received a text telling me about some course that I should book. I called the tutor and he did not knew whats about - I believe that was a wrong text message. --none
- nothing to add
- very good so far, no problems with text service, perhaps more of them

19. This questionnaire covers the pilot so far. We may like to contact you again at the end of the course to complete another questionnaire which will include questions about the messages we have not yet sent.

Please tick this box if you do NOT want to partake in the next questionnaire.

I do **NOT** want to partake in the next questionnaire.

14 7.25%

Thank you for taking the time to complete this questionnaire.

Appendix 19: Dissemination of this research

Internal report

Mobile support for distance learners - summary report of tutors and mobile learning study on OU's internal Knowledge Network - http://kn.open.ac.uk/document.cfm?documentid=11339 (accessed 06/04/09).

Internal OU conference presentation

Making Connections, 29th April 2008, Milton Keynes
Mobiles and student support

External conference presentations

M-libraries, 13th-14th November 2007, Milton Keynes
Mobile support for distance learners: an investigation

Mlearn, 8th-10th October 2008, Ironbridge, Shropshire

Handheld Learning, 14th-15th October 2008, London: Research strand
Mobile learning and student support
presentation available on Slideshare
http://www.slideshare.net/HandheldLearning/jane-lunsford-handheld-learning-2008-presentation (accessed 06/04/09)

Handheld Learning: 5th-7th October 2009, London: Research strand
Using handheld technologies for student support - a model

Published book chapter

Mobile support for distance learners: an investigation
M-libraries conference paper adapted and published as chapter 13 in
Needham, G and Ally, M (2008). M-Libraries: Libraries on the move to provide virtual access. London, Facet.

Journal article

Using handheld technologies for student support: a model
Journal of the Research Center for Educational Technology, vol 6, no 1 (2010) available from http://www.rcetj.org/index.php/rcetj/article/view/82

Appendix 20: Web links referred to in the text

Amazon - http://www.amazon.co.uk/
Del.ici.ous - http://delicious.com/
eBay - http://www.ebay.co.uk/
Facebook - http://www.facebook.com/theopenuniversity
Flickr - http://www.flickr.com/
Google - http://www.google.co.uk/
iTunes U - http://www.open.ac.uk/itunes/
Twitter - http://twitter.com/
YouTube - http://www.youtube.com/theopenuniversity
Wikipedia - http://www.wikipedia.org/